

VISIT...

LANZAROTE
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	CHEESE MAKING ILLUSTRATED ©David B. Fankhauser, Ph.D., Professor of Biology and Chemistry University of Cincinnati Clermont College, Batavia OH 45103	
decanting whey from the curds	This page has been accessed Counter times since 26 July 2000. rvsd 14 October 1991, 20 Sept. '94, 23 Sept. '96, 14 Sept 99, 4 Oct 01	pressing the cheese in a home-fashioned press

How to make cheese at home.

This recipe for a basic hard cheese works for any kind of milk. Iprimarily use my own fresh goats' milk, but have made it quite successfullywith cow's milk purchased from the grocery as well as raw cow's milk froma local farmer. I always use [rennet tablets becauseof their dependability and availability from many supermarkets](#) . I usually make 5 gallons of milk into cheese at a time in a 5 gallon Volrath stainless steel pot. Its thick aluminum bottom pad prevents scorching. Five gallons of milk produces a [5-6 pound wheel of cheese](#) .

I suggest you try several other simplier cheese related projects beforeyou try making a hard cheese. I have written a page on [Beginning Cheese Making](#) for this purpose. It might also be wise to master [the process for one gallon of milk](#) before making cheese from 5 gallons.

The following images will show the critical steps in practically any cheese making endeavor.

INGREDIENTS:

TO TURN FIVE GALLONS OF MILK INTO SIX POUNDS OF CHEESE

five gallons fresh milk (Be sure that it has no off flavors due to bacteria)

2 cups live cultured yogurt (I prefer Dannon Plain. Get the freshest available from the store.) Alternatively, you may use 1/2 cup active cultured buttermilk as starter.

1 tablet rennet "[Junket Rennet Tablets](#)" come in a package of 8 tablets (6.5 g) , by Redco



Foods, Inc., P.O. Box 879, Windsor, CT 06095 (formerly the Salada Foods Division). Here is [what the back of the](#)

[package looks like](#) . They can often be found in your supermarket under the category of "puddings." If they are not there, ask the manager if he would please order them. Most

managers are willing to do so. If that fails, you can order them from the manufacturer. I recently contacted them via email, and they said to call Redco Direct Market at **1-800-556-6674** to order Rennet tablets. [Here is their email response](#). You may find some cheese makers on the web who prefer liquid rennet, and disparage the use of rennet tablets. I prefer using materials which are readily available locally. I have not had problems making cheese associated with Junket tablets. Here is a whole [page devoted to rennet](#) ...

1/4 cup salt

APPARATUS:

thermometer, reading -10 to 110°C (0 to 225°F) (I prefer centigrade, but include Fahrenheit numbers as well)

wooden mixing spoon or whisk

Stainless steel pot (with a heavy thick bottom is best) or enameled pot, 5 gallons, with lid, sterilized. ¹

8" strainer (You may use a colander, though the whey does not flow through as fast as a strainer.)

PRESSING FRAME: (Here is a page on how to [assemble a cheese press at home](#) .)

pressing frame (6" x 9" piece of PVC pipe or tin can, with ends removed)

a 'follower': circular block of wood, 5.5 inches diameter

5 gallon canner

large white dinner plate

white dish cloth (non-terry), very clean

rubber band cut from an inner tube

two chop sticks

quart mason jar

PROCEDURE:



THE NIGHT BEFORE YOU MAKE CHEESE:

1.a. **Sterilize the pot:** The evening before you plan to make cheese, place a small amount of water in your cheese pot, cover, and heat to boiling for 10 minutes to sterilize the pot and lid.

1.b. **Warm 5 gallons of milk to 20°C (68°F)** in a sterilized pot: skim the cream off of **five gallons of the freshest milk** (save for [ice cream](#)). Warm the milk to 20°C (68°F) slowly so as to not scorch the bottom).

2. **Add starter:** [Blend 2 cups yogurt with 2 cups warmed milk](#) until smooth, stir into the five gallons of warmed milk to thoroughly mix.

Alternatively, you can use **1/2 cup of active buttermilk** as starter. Because the bacteria in buttermilk grow much faster at room temperature than those in yogurt, do not incubate longer than 8 hours or warmer than 70 F or the milk may over acidify and begin to clabber. Partially clabbered milk will not yield a clean break.

The function of this inoculation with bacterial starter is to lower the pH so that the rennet will be able to act on the milk protein (casein).



3. **Cover with the sterilized lid.**

Let the inoculated milk sit at room temperature overnight (68-72 F, 20-22 C). (No external heat.)



THE MORNING YOU WILL MAKE CHEESE:

4. The next morning, [skim off additional cream](#) (if you like, it makes delicious pancakes) slowly warm milk up to 30°C (86°F). Take care not to scorch it on the bottom.





5. Dissolve the rennet:

Meanwhile, dissolve **1 tablet of Rennet in 1/2 cup cold water** .

Alternatively, if you have liquid rennet, you add 1 teaspoon per five gallons of inoculated milk (4 drops/gallon). (I have only used tablet rennet, but am assured that liquid rennet works just as well if fresh.)



6. **Add dissolved rennet to warmed milk** with stirring to mix. Cover, let sit *undisturbed* for 1 to 3 hours.



7. TEST FOR A "CLEAN BREAK."

THIS IS NOT A "CLEAN BREAK":

To test for "**clean break**" (completed action of rennet), probe a clean finger into (hopefully) gelled milk and lift. If the gelled milk is not firm enough to split cleanly as you lift, let milk sit until clean break is obtained. (*Do not stir.*) This may take as long as 3 hours. Be patient, do NOT disturb the milk. Keep warm. Here is a page to help you [diagnose the problem of inability to get a clean break](#).



8. THIS IS A "CLEAN BREAK"

When the gel is firm enough to break cleanly as the finger is lifted, go to next step. ([Here is a very large version of the clean break](#) .)



9. Once a clean break is achieved, cut the curd with a long blade:

Begin the cuts at one edge of pot, cut straight down the side to bottom. Cut repeatedly parallel to first cut, but increasing the angle of the knife until you reach the other side of pot.



10. Rotate the pot 90 degrees, repeat series of cuts as before.

Rotate and cut a total of three more times (four in all), yielding $\frac{1}{2}$ inch cubes of curd. Cover and allow the curds to settle for about 15 minutes. Pour off the whey above the curds, saving for ricotta if you like.



11. "Cook the curds": After sitting for 15 minutes and pouring off excess whey, place pot over a low fire, stir curd with thoroughly cleansed bare hand by reaching down to bottom, gently lifting with an open hand to stir. Cut larger curds as they appear. Do not mash or squeeze. If you want to set aside some for a type of cottage cheese, remove a portion of the curds at this step and refrigerate before you raise the temperature. Stir continuously as you heating (curds will clump together otherwise), until the milk is 34°C (95°F) for soft curd cheese, or as high as 39°C (102°F) for very firm cheese. Note: you need a quality thermometer for this 'cooking' step: a small change in temperature makes a great deal of difference in the consistency of the curd/cheese.



12. Stir and maintain desired temperature until curd has contracted to consistency of firm scrambled eggs. Remove from stove.



13. Separate the curds from the whey:

Let the "cooked" curds sit for a few minutes. The curds should sink in whey. [If [the curds float](#) , you have a gas-producing contaminant in your starter. It does not necessarily ruin the cheese, indeed, you might WANT bubbles in your finished cheese. Butfloating curds are more difficult to separate from the whey than sinking curds.]

Decant off whey through a strainer (you may line the strainer with clean cloth if the curd is very fine grained).



14. Decant (pour off) as much of the whey as you can. Drain well.

(Save the whey for [ricotta](#) if you like.)

15. Place curds in a large bowl.



16. Salt the curds:

Sprinkle **1/4 cup salt** over curds, working with hands to mix. Pour off accumulated whey.

The salt is necessary so that the cheese will not spoil as it cures. I have tried making cheese without salt and it rotted. However, unsalted, uncured cheese may be frozen until use.



17. Load the press with the salted curds:

Place the still-warm salted curds into a cheese press. (See separate page for [assembly of cheese press](#) .)

It is necessary for the curds to be warm in order for them to 'knit' together to form a solid cheese during pressing.



18. Press the curds:

Let sit in the press for 12 hours or so.

19. Remove the cheese, wrap in sterile bandage:

The next AM, remove from press, remove cloth, rub outside of cheese with salt and wrap with fresh sterile handkerchief "bandage."

20. Age to develop a rind:

Place the bandaged (wrapped) cheese on a non-corrosive rack (plastic or stainless steel) in the refrigerator. Replace "bandage" daily as long as it continues to become wet. Turn the cheese so that it dries evenly.

21. Wax the cheese

When the cheese has formed a dry yellowish rind (two or three weeks), [dip in melted wax](#) , store in refrigerator for at least a month (if you can wait that long). Let age longer for sharper cheese.



Here is the finished wheel of cheese two weeks later with a wedgecut out of it. I did not wax this wheel since we were going to eat it immediately. [The stains on the outside of the wheel are from being in the iron ("tin" can) press too long: it remained in the press for 30 hours, and the iron in the can reacted with the curd... Though I do not think it to be a problem health-wise, it doesn't look as good as it might otherwise look. I have since switched to a pressing cylinder made of PVC pipe].

¹ Avoid aluminum pots, the acid will dissolve them. Sterilize the pot just before use by placing ½ inch of water in the bottom, covering, and bring it to a rolling boil, [continue heating for five minutes after steam shoots out from under the lid \(although the steam is not clearly visible in this jpeg\)](#). Pour out the water, replace sterile lid, keep sterilized pot covered until you are ready to add the milk.)

	SETTING UP A HOME MADE CHEESE PRESS copyright 2000 by David B. Fankhauser, Ph.D. Professor of Biology and Chemistry U.C. Clermont College Batavia OH 45103	
Line the pressing cylinder with a clean dish towel	22 Feb 1982 This page has been accessed Counter times since since 26 July 2000.	The assembled press

Pressing the fresh curds to remove excess whey is important since spoilage of the cheese is hastened by retention of too much water in the finished cheese. This cheese press can be fashioned from items you may already have in your kitchen, or which should not be difficult to obtain. The pictures show the use of the press to press curds from the [recipe to turn five gallons of milk into cheese](#) . Click the last two images ([13](#) & [14](#)) to see full sized pictures for what the assembled press looks like. Note that some cheese recipes are very specific about the pressure applied to a given cheese. I have not calibrated this press, but it works perfectly with the [cheese recipes I have posted](#) . The pressure can be adjusted either by adjusting the width of the rubber band, or by adjusting the height jar used in the press.

CHEESE PRESS MATERIALS

5 gallon canner

large white dinner plate with smooth bottom

white dish cloth (non-terry), *very clean* (boiled and hung in the sun for an hour or two to sterilize)

pressing frame: 6" x 9" cylinder made from PVC pipe (or large can without ribs on the sides, ends removed)

the "**follower**:" a circular block of wood cut to fit inside pressing frame (5.6 inches diameter)

5/8 inch wide **rubber band** cut from an automotive inner tube (cut it wider for greater pressure).

two **chop sticks**

quart mason jar (use a half gallon jar for greater pressure)

PROCEDURE



1. Place a large, smooth bottomed dinner plate inverted in the bottom of a canner (to keep assembly up out of the expressed whey).

8. Place [wooden block](#) [follower](#) on top of cheese. I am using a follower I cut from cypress.



2. Place pressing frame can on top of plate. Here I am using a 9 inch length of 6 inch PVC pipe cut from a discard from a construction site. In the past I have used large a tin can with both ends cut out. I FAR prefer the PVC pipe because it does not

9. Press wooden block ("follower") down on top of curds. Pull up evenly on the cloth all around the circumference to remove wrinkles.



corrode,
and the
cheese is
removed
much more
easily in the
last step.



3. Lie a
very clean
dish cloth
over the
can.

10. Attach
inner tube
rubber band
through
canner
handles with
chopsticks



4. Push
cloth down
into the can
to form a
"bag."

A
rubberband
stretched
around the
top is
helpful to
hold the
cloth in
place for
the next
step.

11. Pull up
on attached
rubber band,
insert a
Mason jar
underneath so
that the band
will press the
jar onto the
wooden
block.

A half gallon
jar exerts
more force
than a one
quart jar.





5. Add salted curd into the cloth "bag." Note that the curds should still be warm to allow molding and cohesion into a wheel. The final wheel may crumble if the curds are too cool.

12. Press down on the jar to exert added initial pressure on curd. Align the tension of the rubber band so that the jar is vertical (and the follower board is horizontal).



6. "Sweep" all of the curd into the press.

13. Assembled press from above. (Click image to enlarge)



7. Pull up on the corners of the cloth to remove wrinkles between curds and can.

Shake to settle the

14. Assembled press from side. Allow cheese to remain in press until no additional whey is pressed out (about 12 hours).

Here are two pictures taken





curds and
reduce
folds in the
cloth.

about 12
hours apart.
Note the
compression
after 12 hours
(the second
picture).



REMOVING THE CHEESE WHEEL FROM THE PRESS:



Cheese pressed after 12
hours



Pressing frame removed
from canner.



The cloth is peeled down
from the cheese



The follower is
removed. The edge will
be cut smooth, the
cheese rubbed with salt,
wrapped in a
handkerchief, and cured
in the fridge for 2-3
weeks.

Return to [Fankhauser's Cheese Page](#)

or

Go to [David Fankhauser's Main Page](#)

Send Email to: FANKHADDB@UC.EDU







FANKHAUSER'S CHEESE PAGE

©David B. Fankhauser, Ph.D.,
Professor of Biology and
Chemistry
University of Cincinnati
Clermont College,
Batavia OH 45103



I make my cheese from
goat's milk, but
store bought can work.

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times since 1 Sept 2000.
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modified on NaN undefined NaN.
Created 4 December 1998.

Pouring off the whey
from curds and whey.

Here is an abbreviated alphabetized table of recipes on this site:

[Blue cheese](#)
[Buttermilk](#)
[Cheese, basic hard, 1 gallon](#)
[Cheese, basic hard, 5 gallon](#)
[Cheese Making, Beginning](#)
[Cheese press, home made](#)
[Cheese Videos](#)
[Clotted Cream](#)
[Ice Cream](#)
[Labneh](#)
[Mascarpone](#)
[Milks, nutritional content of
various](#)
[Milking, and milk, proper
handling](#)
[Mozzarella, American](#)
[Mozzarella, Fresh \(Pasta Filata\)](#)
[Mozzarella, Italian](#)
[Root Beer, home made](#)
[Schnecken sweet rolls](#)
[Swiss Cheese](#)
[Trouble shooting: No clean
break?](#)
[Yogurt](#)
[Whole Wheat Bread](#)
[Cream Cheese](#)
[Limoncello](#)

Farmer's Cheese	Neufchatel	Lemon Ice (Granita al Limone)
Feta	Panir	"Pane Rustica": crusty, chewy, delicious Italian bread
Ginger Ale, home made	Rennet	
Gjetost	Ricotta	

[Comment Page](#) (Java must be on to view "comments.")

[Links?](#)

News flash: *Culinary Institute of America* Kids website features Fankhauser's Neufchatel recipe [here](#).

Here is a new page for beginning cheese makers which lists a series of cheese making projects starting with the simplest to the more challenging. If you are new to cheese making, and wish to try this rewarding cottage craft, go to [Cheese Making for Beginners](#) .

I have been making cheese since the early 1970s when my wife, Jill and I began "homesteading" on a little farm in SW Ohio. We were interested in achieving as much self-sufficiency as feasible in the late 20th century. Our activities have included keeping a herd of dairy goats. As a result, we have performed countless experiments making various cheeses, yogurt and other milk products. I teach some of these techniques in my biology labs at the University of Cincinnati Clermont College. In participating in Cheesemaker's Discussion Boards over the years, I have seen many of the same questions arising over and over. To answer the recurring questions, I have put together a collection of my recipes, protocols and suggestions for making and using these various milk products.

NEW FEATURE: The page valuable to beginning cheesemakers is how to [trouble shoot a failure to get a clean break](#) . An additional [page is on rennet](#) : what it is, how to prepare it, where to purchase it.

COMMENT PAGE: Do you have comments on any of the recipes on this page? We now (with the assistance of Jan Carter) have a page for comments and suggestions. Follow the link to the [Comment Page](#) .

Here are recipes for cheese and other fermented food products, and milk-related information pages, all alphabetical except for the first and newest additions. I have successfully used all of these recipes.

Alphabetical listing of Recipes and Topics.

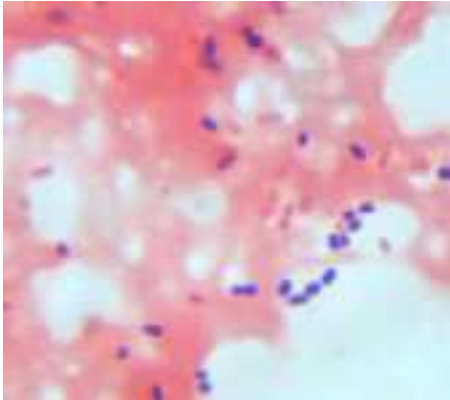
(See [top of page for a table of contents](#) .)

Thumbnailed image	Topic	Comments
	Bacteria, how to smear and stain	Considerable interest has been shown in the properties of the actual bacteria which ferment milk. You can easily observe <i>Lactobacillus</i> and <i>Streptococcus</i> in yogurt, as well as <i>Streptococcus</i> in buttermilk with a simple microscope and stains purchased at your local pharmacy.
	Bacteria in yogurt, buttermilk and sour cream .	Here is a Lab exercise I wrote to investigate the microbe in these foods.
	Basic Cheese for one gallon of milk	Turning fresh milk into hard cheese which can be waxed and cheddared. Delicious
	Basic Cheese, for five gallons of milk Illustrated	On these page you will find the steps of cheese making illustrated with pictures taken as I was turning 5 gallons of milk into cheese.



[Blue cheese](#)

Inoculate your curd with a suspension of desired blue cheese to make your own home produced blue cheese.



[Buttermilk](#)

The simplest of fermented milk products



[Cheese press at home](#) .

You can assemble a cheese press from materials around your home with instructions on this page.



[Cheese Videos](#)

Here is a page of videos which I took of the critical stages in the cheese-making process. Thanks to Jan Carter for helping to convert the videos to web files.
(You will need Real PlayerG2 to play them.)



[Feta](#)

A brined fresh Greek cheese, white, crumbly, and excellent in salads or with kalamata olives



[Ginger Ale, Home Made](#) .

Instructions on the easy steps to turn ginger root into a delicious bubbly beverage.



[Gjetost](#)

This Scandanavian cheese is made by reducing (boiling down) whey left over from making cheese. Traditionally it is made from goat's milk (gjetost means "goat cheese.")



[Ice Cream](#)

(Now illustrated!) Made simply from cream, sugar and vanilla. Superb. Can be made with half and half.



[Labneh](#)

A simple yogurt cheese of the Middle East.

[Mascarpone](#)

This is an extra-rich version of cream cheese, used in many Italian deserts, or just with some fresh cut-up fruit with a little sugar. Yum.

[Milk, nutritional content of](#)

Here is a page I put together to demonstrate and discuss the differences in cow's, goat's and human.



[Milk, proper handling of](#)

If you have dairy animals, or a source for fresh raw milk, here is a page describing sanitary handling techniques to minimize bacterial contamination from the time it is milked to when it is turned into cheese.

[Mozzarella \(American\)](#)

A recipe modified from "Joyce's" on the [Lactobacillus Board](#) . Easy, uses citric acid and microwave oven.



[Fresh Mozzarella](#)

A recipe I have perfected which is easier and more dependable than the Italian Mozzarella recipe I have been using for years, but produces cheese at least as good as the older recipe.



[Mozzarella \(Italian\)](#)

A recipe for fresh mozzarella, white, tender, succulent (not remotely like the tough American pizza version)



[Neufchatel Cheese](#)

An unripened soft rennet cheese, relatively easy for beginner cheese makers. ["Farmer's Cheese" or "Chevre"](#)
This is another soft unripened rennet cheese, similar to Neufchatel.



[Rennet](#)

Rennet, made historically from the lining of a suckling kid's stomach, is used to curdle milk into curds and whey. This page discusses its origins, and where you can purchase either from your local supermarket, or on the web.



[Ricotta Making](#)
[Illustrated](#)

A fine curd cheese made from the whey left over from basic cheese. Illustrated steps for turning 5 gallons of whey into ricotta.



[Schnecken sweet](#)
[rolls](#)

Wonderfully delicious, if caloric. Make them the same time you make [whole wheat bread](#) .

	Root Beer, Home Made .	Easy use of baker's yeast to make root beer in your kitchen.
	Making Swiss Cheese .	Making Swiss cheese is NOT easy, but may well be worth your effort. You will need to secure a culture of <i>Propionibacter shermanii</i> Please let us know your experiences.
	Whole Wheat Bread	By popular request--another fermented (non-cheese) recipe. We have been eating this delicious wholesome bread for decades.
	Yogurt	Use heat-loving bacteria to produce this famous healthful food. (Illustrated with photographs.)

Links to other Cheesemaking sites, Discussion Groups, etc.

Here are some links that I have participated in over the years. Unfortunately, some come and go according to how well maintained the board is, so please let me know if these links don't work:

Countrylife	has replaced the "Lactobacillus Board," once the most active of cheese making discussion boards. You must become a member to post, but can read the messages without becoming a member. It is the most active board on cheesemaking that I know of at the moment, but has yet to achieve the level of the old Lactobacillus Board.
Fiasco Farm Site	has a couple of recipes you might want to check out. (Ops... Someone should tell them that goats do <i>not</i> have upper incisor teeth as shown in their logo...)
Homesteading Today	is another site that is concerned with a variety of homesteading skills including dairy and cheesemaking.
Nikolce's Cheese page	A cheese page by Nikolovski Nikolce, a Macedonian friend of mine. He offers "the basics of the cheesemaking, starter cultures, free cheese recipes, new trends in the dairy industry, practical advices and an introduction in food safety."
DOM's Kefir Page	Dominic N. Anfiteatro displays his passion and depth of knowledge about all things kefir on this self-published page. We met him years ago on the old Lactobacillus Board. If you have questions about kefir--he is your man.
Kenya Handbook on making cheese	This interesting site reproduces a pamphlet for small milk producers in developing countries. It has a good introduction to cheese making, and contains recipes for "Pasta Filata" (a mozzarella-like cheese), Feta, and "Alpine Farmhouse" cheese (a Swiss-type cheese).
WildFermentation	Interested in fermentation and other uses you might make of it at home? Check out "Wild Fermentation" for an interesting perspective on a variety of fermentation-related topics.
smalldairy.com	Established in 1998 to assist small commercial dairies in finding information about on-farm and artisan processing, this site now also serves homesteaders, suburban kitchen cheesemakers and food-lovers seeking sources of wholesome dairy foods and the tools to produce them.
DEFUNCT?	These used to be interesting sites. If you have new info on them,, let me know.

Artisan Cheesemakers-L	contains a couple recipes for making cheese, and tells how to sign up for membership in an email-based discussion group, if you like to do your discussing via email. (URL did not work for me the last time I tried it... Is it ALSO defunct? Rumor is that it went totally to an email format. Anyone know? Julia F??? You out there?) Here is an email from Barbara Harick updating several links .
New Zealand Home Dairy site	This is a new site (2005) in New Zealand for home milkers and makers of cheese, butter, yogurt, ice cream ... and anything dairy. They also sell some basic cheesemaking supplies

If you are interested in an email-based discussion group, try "Cheesemakers List - Artisansrus.com". Send an email to cheesemakers@artisansrus.com and ask to be place on their service list. Mark E. in Oz is the moderator.

WHERE TO GET SUPPLIES?

I have purposely tried to develop recipes which use ingredients easily found locally in supermarkets. Ask the manager for help. However, if you are looking to buy from a specialty source, check out these companies.

I do not officially endorse any commercial establishment from these pages, but have heard positive comments from others about them. Let me know what your experience is with them.

New England Cheesemaking	Many folks report that New England Cheesemaking has served them well. They are one of the long time sources for cheese making materials.
Glengarry Cheesemaking & Dairy Supply	According to correspondent cheese maker Johnnie Townsend: "This company is out of Canada and their prices seem to be quite acceptable. I have ordered several cultures from them. They are very helpful also."
The Grape and Granary	This site specializes in brewing materials, but has a page of cheese making materials as well. It was recommended by a visitor to my site. I have not purchased anything from them.
Danlac Cheese Making Supplies	Danlac provides cheese making supplies, cheese making equipment, yoghurt making supplies and meat and dairy bacteria cultures to the food processing industry. They are happy to supply kitchen cheese makers as well, and havew sections devoted to " home " and " farm " quantities of materials.



	"SIMPLY ICE CREAM" ILLUSTRATED ©David B. Fankhauser, Ph.D., Professor of Biology and Chemistry University of Cincinnati Clermont College, Batavia OH 45103	
Inserting dasher into freezer can	File "ICECREAM00.HTM" was last modified on NaN undefined NaN. This page has been accessed Counter times since 24 July 2000. Revised 29 January 1999, 2 May 2000, 5 June 2000, 3 April 2003	Housing the finished ice cream

I first posted this recipe June 29, 1998 on the [Lactobacillus Board](#) , now defunct. The site [Countrylife](#) has taken it over.

Simplicity is my watchword. Here is the recipe I have refined for making ice cream, containing what I believe are its essentials. Yes, you can do all kind of experiments making flavored ice cream, but I suggest you try this pure and simple ice cream first. After it is made, you can top it with a little fruit, chocolate sauce, or sprinkle a little powdered instant coffee on it for flavor variations. This page has two parts, first the [recipe for the ice cream mixture](#) , and second, the [technique for freezing ice cream](#). Finally, I have included a [review of my White Mountain Freezer](#) (the Cadillac of freezers).

RECIPE FOR SIMPLY ICE CREAM

INGREDIENTS:

2 quarts of "medium" cream: either Half and Half or cream skimmed from fresh milk left undisturbed for several days.

2/3 cup sugar (more if you like it sweet)

1 Tbl good vanilla extract

Add all these ingredients to the freezer can, insert dasher and cover.

The following steps include skimming instructions if you have your own source of whole milk.
(Click on the pictures for full sized images.)



1. Use either Half and Half or skim the cream off of fresh milk which has set undisturbed for several days (In the image, I am skimming goat's milk which has set in the refrigerator for four to six days. (Follow strict instructions for [proper handling and chilling of fresh milk](#) to ensure that it will not have developed an off flavor in the meantime.) If you need to skim the cream, but do not plan on making ice cream at that moment, you may freeze the cream until use. Then thaw it and continue with this recipe. However, freezing and thawing causes some flocculation of the butter flakes and can make your ice cream buttery.



2. Add a total of 2 quarts of cream and/or Half and Half.



3. Add 2/3rds to 1 cup of sugar (adjust for the sweetness you prefer in your ice cream). Commercial ice cream add closer to 1 1/2 or even 2 cups of sugar for a half gallon of liquid.



4. Use real vanilla (vanillin does NOT taste like the real thing). We use an aged vanilla available from a local "Old Time Store."



5. Add 1 tablespoon vanilla (two if you like a stronger vanilla taste). You can also add a tablespoon of rum or whiskey to enhance the vanilla flavor.



6. Insert the dasher, cover with the lid.

7. Freeze as outlined below in "[Instructions for Freezing Ice Cream](#) ."



8. Halt the freezing process when the ice cream is slightly soft (do NOT over crank or you will get butter flakes in your ice cream, not usually a desirable trait for ice cream...). Pack in covered containers labeled with the date of "manufacture."

INSTRUCTIONS FOR FREEZING ICE CREAM

(I will try to get some pictures together to illustrate this process. Stay tuned.)

SUPPLIES NEEDED:

Up to 10 pounds finely chipped ice. If you can only get larger chunk ice, you may have to crush it by placing in cloth bag and hammering it down to pieces no larger than $\frac{1}{2}$ inch diameter. The smaller the size ice, the faster the ice cream will freeze. Too big, and the chunks will impair the turning of the bucket. The actual amount of ice needed varies with the freezer.

1-2 pounds of rock salt. (You can use any salt, but rock salt is cheapest. Fine grained salt will freeze ice cream faster.)

Favorite mix for ice cream, liquid (See above)

EQUIPMENT NEEDED:

2 cup measuring cup to measure the ice

1/4 cup measuring cup to measure the salt (or assume your handful is 1/4th cup)

Your ice cream freezer, either hand or machine cranked. (I have graduated to a White Mountain machine, expensive but the best quality freezer I have found.)

- 1) Add the ice cream mix to the freezer can, insert dasher and place lid on the freezer can.
- 2) Place assembled freezer can in bucket, attach turning mechanism, lock in place.
- 3) Scoop a 2 cup measure of ice and pour into bucket on either side of the turning mechanism. (4 cups total)
- 4) Scoop in a 1/4 cup measure of salt on either side of the turning mechanism. I have found that one of my handfuls is equal to 1/4th cup, so I add salt that way. (one measure for each side = 1/2 cup total). You can turn on the machine now.
- 5) Repeat the alternating layers of 2 cups ice and 1/4 cup salt per side until both sides are filled up to the top of the can.
- 6) After turning for a few minutes, the ice will melt down some, and you should add 2 additional cups ice to both sides, followed by 1/4 cup salt to both sides. Keep the level of the ice near the top of the freezer can.
- 7) Check on the consistency after 10 minutes of cranking. Depending on the design of the can and the amount of ice cream mix added, the ice cream should be frozen in 10-20 minutes. Listen for the motor to labor, or notice that the hand cranking is getting HARD.
- 8) Turn off machine, remove turning mechanism and lid, and examine the consistency. It should have risen up in the can and LOOK like "soft- whip" ice cream. It is best to stop when it is the consistency of moderately firm "soft- whip" ice cream for two reasons:
 - a) it is much easier to pack (put it immediately into your freezer after you house it), and
 - b) it is less likely to turn the cream to butter (from excessive cranking).

Some machines call for packing additional ice and salt after removing the dasher to further harden it.

This is good for picnics, but at home, I put it straight into the freezer.

I have owned many different kinds of freezers, and have used this 8:1 ratio of ice to salt for all of them. The White Mountain Freezer I recently purchased calls for 6:1 ratio, but I'm not convinced it requires that much salt, since there is always undissolved salt left in the bottom.

Good Luck, and delicious eating to you.

Review of the White Mountain Ice Cream Freezer after several years of use:

POSITIVES:

- 1) Generally high quality materials, sturdy, the freezer can is stainless steel.
- 2) Makes excellent smooth ice cream, partly due to the "double action" of the dasher.
- 3) Freezes relatively quickly (though this is also relative to the ice chip size and amount of salt.

NEGATIVES:

- 1) It is quite noisy during operation.
- 2) It requires more ice to fill the bucket than most freezers of the same capacity.
- 3) Although the freezer can is stainless, the hoops on the bucket are iron, and are rusting badly.
- 4) The latch which holds the turning mechanism in place is very tempermental, often requiring several repositioning attempts with the whole turning mechanism before it can be latched (very annoying).
- 5) The locking mechanism holding the turning mechanism is made of iron and is severely rusting.
- 6) I have yet to find a machine from which the ice cream is easily packed. The "double action" dasher has even more nooks and crannies which must be cleared of ice cream when packing the ice cream.
- 7) It is quite expensive (I think I paid around \$160 for the 3 quart electric freezer in 1999).

Added in 2005 after 5 years of use:

- 8) The iron hoops which hold together the wooden tub rusted and broke. I replaced with stainless steel banding.
- 9) The wooden staves pull apart when the bucket dries, leaking salt water onto the floor.
- 10) **Worst:** the motor burned out in Fall of 2004. I sent off to the manufacturer and purchased a new motor for about \$36 which I was able to install. In the interim, I tried two inexpensive (and terrible) models of ice cream maker--one from Sam's club (the drive connection was so weak that the dasher slipped way before the ice cream was ready) and one from Home Depot (took 45 minutes to make ice cream). VERY happy to have my White Mountain back in operation.

However, all in all, I have not found a better machine yet.

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	ARE YOU HAVING PROBLEMS GETTING A CLEAN BREAK? ©David B. Fankhauser, Ph.D., Professor of Biology and Chemistry University of Cincinnati Clermont College, Batavia OH 45103	
Coagulation has started, but this is <i>not</i> a "clean break."	File "Problem_getting_a_clean_break.html" was last modified on NaN undefined NaN. This page has been accessed Counter times since 24 January 2003. First posted 28 September 2002	Clean break: coagulated milk holds together, clear whey fills the gaps

For beginning cheese makers, I strongly recommend that a [series of cheese related projects to be mastered](#) before attempting to make 'basic cheese.' With a basic cheese, the step which most often presents difficulties is the ability to achieve a clean break. Test for a clean break by plunging a clean finger into the inoculated & renneted milk and lifting. Properly coagulated milk should break cleanly around the finger, and clear whey should fill the gaps produced:



Ninety nine percent of the time, the failure to achieve a clean break is because one or two of a few critical requirements have not been met. I first posted a list of check points on the [Countrylife Dairy Discussion Board](#) in September 2002. Here are the critical factors:

Critical factors in getting a clean break:

1. Good quality fresh **milk** (if it has started to turn or has a high bacterial count, it can interfere with lactic bacteria)
2. Active bacterial **starter**, correct proportions mixed in thoroughly
3. **Proper incubation** with the starter to slightly acidify the milk.
4. **NOT over acidified**. This would cause it to slightly clabber (thicken). Even slightly clabbered milk will never yield a clean break.
5. Active **rennet**, correct proportions, mixed in thoroughly
6. Correct time and temp for **coagulation**, *undisturbed*.
7. See below for a discussion of the [possible need for calcium](#) to get firm curd in store-bought milk...

Note that there are two different approaches to making cheese with regard to timing of inoculation and adding rennet:

1. Add the starter the night before, let sit at room temperature, and add the rennet the next day. Let sit until a clean break, usually 2-3 hours.
2. Add the starter and after a few minutes, add the rennet. Let sit until a clean break, anywhere from 1 to 8 hours depending on proportions.

HERE ARE QUESTIONS ABOUT THE CRITICAL PARAMETERS FOR GETTING A CLEAN BREAK:

1) Was the milk fresh, and warmed up to room temperature?

If milk has started to "turn," the wrong bacteria can grow and prevent the starter bacteria from growing properly and acidifying the milk. (If you use store bought, check the expiration date for the freshest.) Also, if the milk is not warmed properly (at several stages), bacteria will not grow, or rennet will not act on the milk.

2) Was the starter fresh and active (either buttermilk or yogurt)?

The bacteria in the starter must be alive and well. Bacteria may have died in outdated starter. When in doubt, purchase the freshest buttermilk or freshest Dannon plain yogurt which you confirm is not outdated.

3) Did you add the correct proportions of starter for milk?

If you add too little starter, the milk will not be acid enough for the rennet to work. If you add too much, the milk may get over acidified and curdle. Over acidified milk is recognize the by a slight thickening (clabbering) of the milk. *The milk should look exactly like regular milk* when the rennet is added. If the milk is even slightly clabbered, you will NEVER get a clean break Remember that buttermilk contains mesophilic bacteria which grow well at room temperature while yogurt contains thermophilic bacteria which grow more slowly at room temperature. Buttermilk bacteria are aggressive acidifiers. Therefore, it takes 1/2 to 1/4th as much buttermilk as yogurt to act as starter. (With very active buttermilk, you

may only need 2 tablespoons/gallon of milk for proper acidification.)

4) After adding bacterial starter, did you let the inoculated milk incubate (sit) at room temperature overnight?

Bacteria will not grow if the milk is not warm enough. It should stay close to 68 F (20 C) overnight so that the bacteria can grow and make lactic acid to acidify the milk. This room temperature incubation is mandatory. If it is too warm, the milk may over acidify.

5) The next morning, did you warm the inoculated and incubated milk up properly before adding the rennet?

Because rennet is an enzyme, it works better at warm temperatures, and hardly at all in cool milk. Also, if the milk is warmed too high, the curd will be tough, and alter the quality of your cheese. The consistency of the milk should not change when warmed.

6) Was the rennet active, did you use the correct amount?

Rennet is an enzyme, and can deteriorate with time. I have never had problems with Junket Rennet tablets going bad even after a year or two, but I *have* heard of liquid rennet losing its potency. Obviously weakened or inadequate quantities of rennet will require longer to achieve a clean break, if ever. If you add too much rennet, I have heard that the curd may taste bitter, but I have never experienced this. It will not hurt to add twice the called for rennet if you are in doubt as to its potency.

7) Did you let the inoculated milk sit UNDISTURBED after you added the rennet? (This is crucial to getting a clean break.)

If you disturb the inoculated milk after it has begun to set, even a little, you may never achieve the tight curd required for a clean break. Once you have added the rennet, be careful to place the container in a place where it will not be jostled.

8) Were you patient enough to wait for a clean break? (We repeat... DO NOT DISTURB.)

After the specified time (30 minutes to overnigh, depending on the cheese), gently lift the lid, slowly plunge your finger into the milk and lift. If it is still liquid, carefully replace the lid and try it again in an hour or so. If it is slightly thickened, let it sit for another 30 minutes *without disturbing it*. If you have not achieved a clean break in 12 hours, you probably never will.

If you did all these, then you should expect to achieve a clean break within 2-3 hours at the longest.

THE CALCIUM ISSUE IN FORMATION OF CURD...

The one remaining problem relates to use of pasteurized, homogenized milk (as one would get from the store). I am less familiar with it than the fresh raw goat's milk I use, but the processing alters the protein structure, and may cause problems establishing a firm curd. Some recipes call for purchasing a solution from a cheese making supply house, and adding "1/2 to 1 teaspoons" per gallon (5-10 mL). But nobody talks about the concentration of the solution! I did some research on the web, and there is some evidence that the solution from cheese suppliers may be 0.03 molar CaCl₂. One can approximate a 0.03

molar solution by dissolving 1/2 teaspoon full to a quart of clean water. If you know more on this subject, please let me know! This could be critical for folks making cheese from store-bought milk.

If anyone thinks of any other common reason one might not get a clean break, I am interested to hear about it. Send [email to David Fankhauser](#)







RICOTTA MAKING

ILLUSTRATED

David B. Fankhauser, Ph.D.
 Professor of Biology and Chemistry
 University of Cincinnati Clermont
 College
 Batavia OH 45103



Ricotta is made from whey,
 a biproduct of [a basic cheese](#)

22 Feb 1982, rvsd 24 Feb 92, 5 Aug 98, 24
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After heating to near boiling
 and
 cooling, a fine curd develops

INTRODUCTION:

Ricotta is Italian for "recooked" because it is made by "cooking" whey which is produced when the curds are separated for cheese ("curds and whey," as in little Miss Muffet). The chemistry of ricotta is interesting. Its production relies on allowing the inoculated bacteria in whey to further ferment the liquid as it sits at room temperature for an additional 12-24 hours. During that time, the remaining sugars are converted to lactic acid which lowers the pH of the whey. The solubility of the protein in acidified whey is reduced. Heating the acidified whey denatures the protein causing it to precipitate out as a fine curd. This small-grained curd may be then dipped out or filtered out by pouring through a fine cloth. It can be used fresh or frozen until needed.

EQUIPMENT:

- 1) Non-reactive pot, either stainless steel or enameled (I have a wonderful 5 gallon stainless steel pot with a thick aluminum pad bonded to the bottom to disperse the heat. It is made by Vollrath, and was, I recall, somewhat expensive (\$50-60 ten or fifteen years ago). If you use a thin enameled pot, you should either heat the whey in it over boiling water, or stir nearly continuously.
- 2) Wooden spoon or long handled spatula (with square end to help to keep curd off the bottom)
- 3) Thermometer (0-110 °C) to monitor temperature of whey while heating
- 4) Receiving pot the same volume or greater as cooking pot (a clean plastic bucket will do)

- 5) A fine meshed strainer to dip out floating curd.
- 6) Large strainer to suspend over receiving pot
- 7) Fine cloth (I use a clean sterile handkerchief or a non-terry cloth dish towel)

PROTOCOL:

Whey left from turning five gallons of milk into cheese will make about 1.5 - 2 pounds of ricotta (a quart or so)



1) [Save the whey from making cheese](#) in a non-reactive pot. (Here you see curds for a basic cheese at the bottom of the pot, as the whey is being poured off).

Filter as much of the curd particles out as you can since they would otherwise form tough "beads" in the final ricotta.

Cover and let sit 12 to 24 hours at room temperature to develop sufficient acidity.



2) The next morning, heat the acidified whey with stirring taking care to avoid sticking or burning. Use either a double boiler, or a pot with very thick bottom which will disperse the heat well. This image shows that the temperature has risen to about 82 °C, and a white foam is appearing on the surface.



3) Continue heating with stirring until its temperature is near boiling (95 °C). Note that foam will build up somewhat. (Careful: if it boils, it can boil over...) Remove from heat. Cover and allow the "cooked" whey to cool undisturbed until comfortable to the touch. The curds should look like clouds suspended in the whey, while the whey appears clear and yellowish green. (Riboflavin in the whey gives it this color.)



4) DO NOT STIR UP THE CURD: Set up a receiving pot with a large strainer and a fine clean cloth on top. If the curd is floating, you may dip out the curd into the cloth. Alternatively, if the curd all sinks, pour as much of the whey through the cloth as you can without disturbing the curds. It will filter through MUCH faster if you do this carefully without stirring up the curds.



5) Gently scoop out the curds. Because the curds are very fine and delicate, they can stop up the cloth easily. This will cause very slow draining if they are broken up.



6) You can see that much of the whey will drain out as you dip the curd.



7) After all of the wet curds have been transferred to the cloth, allow the whey to drain out through the cloth (be patient, it can take 2-3 hours). Then pick up the corners of the cloth, suspend like a bag over the drainage pot (or sink) to allow the last of the whey to drain out. It will take several hours, and can be done in the refrigerator over night. The [whey remaining from ricotta is clear, and has a greenish-yellow tint](#) from the riboflavin which remains. This whey has very little protein remaining in it, and I feed it to my chickens and my pig...



8) Remove the ricotta from the cloth, pack into a container, cover and store in the refrigerator. Use it soon after making. Alternatively, ricotta will freeze very well.

It makes delicious lasagna, ravioli stuffing, [gnocchi](#), ("Italian dumplings") and the famous Italian dessert, [cannoli](#), cheese-stuffed shells and blintzes, or a type of cheese cake.

WAXING YOUR CHEESE: WHY AND HOW

David B. Fankhauser, PhD

Professor of Biology and Chemistry

University of Cincinnati Clermont College

Batavia OH 45103

22 March 1999, 3 Jan 00

There are two major benefits of [waxing a finished wheel of cheese](#): it dramatically cuts down on the mold growth and it also prevents the cheese from dehydrating to the point of rock hardness. So long as the wax forms an intimate bond with the surface of the cheese, mold cannot grow in excess, nor can putrefactive bacteria get into the cheese.

Some have suggested plastic bags as an alternative to waxing, but in my experience, they provide *ideal* conditions for massive mold and/or bacterial growth. Fungus requires air and moisture to grow--exactly the conditions inside a plastic bag.

WAXING: I have a pie pan devoted to my waxing: melt paraffin (and *non-scented* candle stumps) and crayon stumps (red works best--some colors are suspensions of colored pigments which sink in the pan). I melt the wax over a low fire, roll the cheese several times thru it to build up the desired thickness on all sides. I dribble melted wax into pockets which didn't get sealed. Label the cheese with the date you waxed it (I use masking tape and magic marker), and store in the refrigerator for as many months as you desire. I then let the wax cool in the pan, and put it away with the rest of my cheese making utensils. I have some of the loveliest assortments of colors for my cheeses, depending on which crayons were added to the particular batch. Also, I presume that, since crayons are made for the use by children who would eat them, that they offer no danger when used in this way.

PROBLEMS WITH WAXING:

CRACKING: My biggest problem with waxing is that it occasionally cracks and flakes off after storage for six months, and mold can then begin to grow. In my experience, cracking occurs for two reasons: 1) too much water left in the curd as it was pressed (warming the curd a little more prior to pressing will help the curd contract more), and 2) the cheese dried out too much before it was waxed. Once the dreaded crevices develop, waxing is much more difficult.

Questions have been raised about "making" softer cheese wax by adding thinners to regular paraffin. I do not think this will work. "Official" cheese wax is a different petroleum fraction during refining than paraffin.





Coagulated milk is cut into roughly 1/2 inch cubes

BASIC CHEESE MAKING

FOR ONE GALLON MILK

David B. Fankhauser, Ph.D.
Professor of Biology and Chemistry
University of Cincinnati Clermont College
Batavia OH 45103

22 Feb. 1982, rvsd 24 Feb. 92, 5 Aug. 98, 24 Oct. 98, 5 Dec 98, 23 Mar 99, 7 Jan 00, 3 Aug. 02
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The cut curd is warmed and stirred to allow it to contract, expressing the whey

[If this is the first time you are making cheese](#), here are the major stages of cheese making:

ACTION:	PURPOSE:
1) Inoculate, incubate the milk	bacteria slightly acidify (ferment) the milk so that the rennet will act on the milk
2) Add the rennet, achieve a clean break	rennet (a digestive enzyme) digests casein, causing it to become insoluble in water and coagulate.
3) Cut and set the curd	coagulated milk is cut into cubes and warmed to contract the curds ("curds and whey")
4) Separate and salt the curd	whey is poured off the "curds and whey," and the curds are salted to preserve them
5) Press the curds	salted curds are loaded into a press which presses out the whey and gives form to the cheese
6) Cure the cheese, wax it	cheese is dried out and bacteria act on the curds to change their taste and consistency. It may be waxed to prevent undesirable dehydration and excessive microbial growth.

One gallon of milk yields about one pound of cheese. You may use any kind of milk for this recipe. I primarily use my own fresh goats' milk, but have made it quite successfully with cow's milk from the grocery, and even better with raw cow's milk from a local farmer. Once you have master this one gallon recipe, follow the [5 gallon recipe](#) to make a larger wheel of cheese.

INGREDIENTS TO TURN ONE GALLON OF MILK INTO ONE POUND OF CHEESE

one gallon freshest milk (the fewer bacteria present, the more predictable the cheese)

1.5 tablespoonfuls [buttermilk](#) (or ½ cup [yogurt](#))

1/4 tablet [rennet](#) (Here is the [front](#) and [back](#) of the rennet package.)

salt

APPARATUS

thermometer, reading -10 to 110°C (0 to 225°F) (I prefer centigrade, but have included Fahrenheit numbers as well)

wooden mixing spoon, whisk or other stirring device

[Stainless steelpot](#)¹, 4-6 qt., with lid, with a thick metal bottom (Al or Cu) to spread the heat, [sterilized](#)².

8" strainer or colander (A colander does not allow whey to flow through as fast as a strainer.)

large handkerchief, sterilized by boiling

[cheese pressing frame](#)(4" diameter, 5" tall can, about 20 oz, ends removed, save one end for a follower)

PROCEDURE

1. **INOCULATE THE MILK:** The evening before you plan to make cheese, warm 1 gallon of the freshest milk to 20°C (68 ° F) in the sterilized pot. Thoroughly blend in the inoculum of [1.5 Tbl buttermilk or ½ cup yogurt as starter](#) . Cover the inoculated milk with the sterilized lid. (The function of this inoculation with bacterial starter is to have the [milk fermenting bacteria](#) make lactic acid which lowers the pH so that the rennet will be able to act on the casein.)
2. **INCUBATE OVER NIGHT:** [Let sit at room temperature](#) (R.T.) overnight (20-22°C).
3. **WARM THE MILK:** The next morning, warm milk up to 30 °C (take care not to burn it). Meanwhile, [dissolve ¼ tablet of Rennet in ¼ cup cold water](#) . (This pictures shows a whole tablet being added to water).
4. **ADD THE RENNET:** [Add dissolved rennet to the warmed milk](#) , stir to mix thoroughly. Cover, let sit *undisturbed* for approximately an hour. Be patient. *Do not disturb the milk* until it has coagulated.
5. **ACHIEVE A CLEAN BREAK:** Test for completed action of rennet ("[clean break](#) "): Probe a clean finger into the (hopefully) gelled milk and lift. If the gel is firm enough to break cleanly as the finger is lifted, go to next step. (If the milk is gelatinous [and flows across your finger](#) , let sit until a clean break is obtained. *Do not stir*. This may take as long as 1-2 hours.) **Be patient, do NOT disturb the milk.** (Here is a link to [trouble shoot "clean break" failure](#) .)
6. **CUT THE CURD:** Once a clean break is achieved, [cut the curd with a long knife](#) : begin at edge of pot, cut straight down to bottom. Cut repeatedly parallel to first cut, but increasing the angle of the knife until reaching other side of pot. [Rotate the pot 90 degrees, cut as before](#) . Rotate and cut two more times, yielding [½ inch cubes of curd](#) .
7. **SETTING THE CURD (RAISE AND HOLD THE TEMPERATURE):** Place pot over a low fire, stir curd with cleaned bare hand by [reaching down to bottom, gently lifting and stirring](#) . Cut larger curds as they appear. Do not mash or squeeze. If you wish to save some soft cottage cheese, remove a portion of the curd at this step before you raise the temperature. Continue stirring for 15 min to prevent the curds from clumping together. Heat curds to 34°C (92° F) for soft curd cheese, or as high as 39°C (102°F) for very firm cheese. The setting temperature makes a great deal of difference in the consistency of the curd/cheese.

8. **SEPARATE CURDS AND WHEY:** Stir and maintain desired temperature until curd has contracted to [consistency of firm scrambled eggs](#) . Remove from stove. The curds should sink in whey. (Ops, did they [float](#)³ ?) [Decant off when through a strainer](#) (you may [line the strainer with clean cloth if the curd is very fine grained](#)). Save the whey for [ricotta](#) if you like. [Place curds in a large bowl](#) .
 9. **ADD SALT:** [Sprinkle two tsp. salt over curds, working with hands to mix](#) . Pour off accumulated whey. (The salt is necessary so that the cheese will not spoil as it cures. I tried it without salt and it spoiled. However, unsalted, uncured cheese may be frozen until use.)
 10. **PRESS THE CHEESE** : Use sterile large white handkerchief to line a smooth-sided 4" x 5" tin can from which both ends have been removed. [Place still-warm curds in the cloth](#) , cover curd with the corners of the cloth, lie the cut-out end of the can on top, and place heavy weight to press down. Let sit for 12 hours or so.
 11. **CURE THE CHEESE:** The next AM, remove from press, remove cloth, rub outside of cheese with salt and rewrap with fresh handkerchief. Place wrapped cheese on a rack in the refrigerator. Replace "bandage" daily (as long as it continues to become wet). When a dry yellowish rind forms (about one to two weeks), [dip in melted wax](#) , store in refrigerator for about a month (if you can wait that long) or longer for sharper cheese.
- ¹ **Avoid aluminum pots**, the acid will dissolve them and possibly overload you with aluminum.
- ² **Sterilize the pot** just before use by pouring ½ inch of water in the bottom, covering, and bring to a rolling boil for at least five minutes. Pour out the water, replace sterile lid, keep sterilized pot covered until you are ready to add the milk.
- ³ **If the curds float**, you have a gas-producing contaminant in your starter or your milk was contaminated. You need to pay closer attention to handling your milk, and/or purchase fresh starter. The bacteria which form bubbles may be a form of *Escherichia*. However, it does not *necessarily* ruin the cheese, but does make it iffy. Many CO2 formers are non-pathogenic. Indeed, you might WANT bubbles in your finished cheese. Think about Swiss cheese... However, to be safe, age your cheese for at least two months because pathogens do not survive this extended aging. In addition, you will have a little more difficulty separating the curds from the whey if the curds float.

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Send Email to: FANKHADB@UC.EDU

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Cutting curd after getting a clean break.

BEGINNING CHEESE MAKING

© David B. Fankhauser, Ph.D.
Professor of Biology and Chemistry
University of Cincinnati Clermont College
Batavia OH 45103



Pouring off the whey after the curd has been cut and warmed ("cooked").

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SUGGESTIONS TO FOLKS NEW TO CHEESE MAKING:

Cheese making is theoretically a *science*, but we also need to appreciate that it is an *art*. While cheese making instructions often appear simple, there are skills and sensitivities which must be developed for successful cheese making. I strongly suggest that you master the following projects in sequence before you progress to more difficult cheeses. As an avid homesteader, I strive to keep the ingredients for these recipes relatively easily obtained from your local supermarket and to use the equipment commonly found in the kitchen.

The [projects are listed in order of increasing difficulty](#) . You are more likely to succeed if you work your way through each one rather than jump immediately to a more challenging cheese.

A DISCUSSION OF INGREDIENTS AND EQUIPMENT:

INGREDIENTS:**Milk:**

You can use commercially purchased pasteurized cow's milk, TB certified raw cow's milk, goat's milk, sheep or even horse's milk. All will make cheese, each with its unique flavor. Cheese from unpasteurized milk should be cured for 2-4 months if there is *any* doubt about pathogens in the milk. If you use pasteurized milk, you may need to add a little calcium chloride to firm up the curd. Cheese can be made from whole milk (3.5%), 2% or from skimmed milk. However, remember that the richness of flavor of the cheese is related to the amount of butterfat in the milk. You should get 1 to 1.5 pounds of cheese/gallon of milk. (Store-bought milk may require addition of a small amount of calcium chloride to aid coagulation.) I have **not** had good luck using reconstituted powdered milk, but have heard some say that they have successfully used it. Make friends with a local dairy person to get bulk milk. (You will have better luck getting milk from homesteaders than with commercial operators.) I keep getting questions about using ultrapasteurized milk, such as is found on shelves of markets in Europe. In my opinion, this milk is nearly worthless in making basic cheese. The protein structure and calcium chelates have been radically altered. If you have success with ultrapasteurized milk, let us know! (You CAN use it to make yogurt and labneh.)

Starter:

Bacteria must be added to acidify the milk so that the rennet will work, and to aid in

EQUIPMENT:

Most decently equipped kitchens have the necessary equipment:

Heavy stainless steel pot with lid: A non-reactive pot is important because the acidifying milk can dissolve aluminum. Enamel pots would work as well. A heavy bottom is important to evenly disperse the heat and prevent scorching. Scorching affects the flavor and is a cleanup hassle. The size of the pot should be large enough so that you have at least an inch of head space above the milk. A cover is needed for the steps when the milk must sit for periods of time. I bought a high quality five gallon pot like this years ago (expensive). I have never been sorry.

Measuring cups You may need measuring cups ranging from 1/4 cup to a quart. Obviously you can improvise, but accurate measurements improve your success rate. Measuring spoons are occasionally needed.

Thermometer An accurate thermometer which reads in the range of 32-225 F (0-100 C) is very important. A candy or meat thermometer can work. There are several reasons that accurate temperature is important: the texture of the cheese depends a great deal on achieving a temperature to within *one* degree. Also, after milk for yogurt is scalded, it *must* be cooled to 130 F for optimum bacteria action.

the curing. Cultured [buttermilk](#) can serve as a mesophilic starter (it likes room temperature), and [yogurt](#) can serve as a thermophilic starter (it prefers warmer temperatures). You can also purchase pure cultures from cheese makers supply houses. Some recipes call for addition of chemical acids to produce acidify the milk. I prefer the flavor of cheese made from bacterially acidified milk. Here is a detailed [description of bacterial cheese starters](#) from Peter Moller. Be aware that, especially with buttermilk, if you add too much starter such that the milk has remotely thickened before you add rennet, you will not get a clean break.

Rennet:

An enzyme rennin converts milk protein (casein) from a soluble to an insoluble material, causing the milk to gel (forming a clean break). It will only work well in acidified milk. The gelling process must be undisturbed to get a clean break. Rennet is commonly available in supermarkets in the pudding section, or you can purchase liquid rennet from a cheese makers supply house. One tablet of Junket rennet is equivalent to 20 drops of fresh liquid rennet.

Whisk Thorough mixing of starter and rennet is important. A whisk is the obvious choice for this step.

Cheese press is required for the hard cheeses. You can purchase them for a handsome price, or [fashion one from materials at home](#).

A SYLLABUS FOR A CHEESE MAKING COURSE:

Try these recipes in the order given for optimum success.

	1. Yogurt	Yogurt is an excellent starting point because you master proper handling of milk, good aseptic technique with the starter and proper temperature control. You will use heat-loving bacteria to produce this famous healthful food. Buttermilk is even easier, but teaches you fewer skills of cheese making.
	2. Labneh	Once you can make yogurt, it is a very simple process to produce this simplest of cheeses. Merely draining the whey from yogurt produces this soft, tart Middle Eastern cheese. Nearly fool proof, delicious results.
	3. Neufchatel	An unripened soft rennet cheese, probably the easiest rennet cheese, a good first cheese for beginner cheese makers. It does not require pressing or curing and is eaten fresh.
	4. Basic cheese for one gallon	Turn a gallon of milk into a pound of cheese: learn to recognize the clean break, cutting the curd, curd management, pressing the curd. A simple cheese press can be made at home .



[5. Basic Cheese for 5 gallons](#)

If you have access to 5 gallons of milk, it is more efficient use of energy to make a 5-6 pound wheel of cheese than a single pound wheel with one gallon. However, I strongly suggest you make the single gallon recipe first to be certain of the steps involved.



[6. American Mozzarella](#)

This is the cheese of American pizzas. It is easy, uses citric acid and microwave oven. If you want to make [fresh mozzarella](#), it is *much* more challenging, but more delicate in texture and flavor. I do *not* recommend this cheese until you have completely mastered the recipe for basic cheese. [Italian mozzarella](#) calls for a more complex inoculum.



[7. Blue Cheese](#)

Inoculate your cheese curd with a suspension of desired blue cheese to make your own home-produced blue cheese. The most difficult aspects of making this cheese are its stringent requirements for temperature, humidity, and daily turning.

FAQ: Here are a few pages for frequently asked questions:

WHY CAN'T I GET A CLEAN BREAK ? A common problem for novice cheese makers is failure to achieve a clean break. This page contains a check list of the critical factors.

WHAT IS RENNET ? This page is on rennet: what it is, how to prepare it, where to purchase it.

COMMENT PAGE : Do you have comments on any of the recipes on this page? Did you have success? Do you have a suggestion for improvement of a recipe? Do you have a new recipe you would like to offer? Thanks [Links to other Cheese making sites](#), [Discussion Groups](#), etc.

LINKS:

WHERE TO GET SUPPLIES? I have purposely tried to develop recipes which use ingredients found locally in supermarkets. Ask the manager for help. However, if you are looking to buy from a specialty source you can do a [search on the web](#) for web locations. While I do not officially endorse commercial establishments, many folks report that [New England Cheesemaking](#) has served them well.

ARE THERE DISCUSSION GROUPS ON CHEESE MAKING? I participate in two groups. One is on the web at [CountryLife](#) . I like their format allowing easy review of the string of comments. You can read the comments, but must register to post comments. The other, "Cheesemakers List - Artisansrus.com" is email-based, and you must join the service list to send and receive comments. Send an email to [Mark E. in Oz](#) who moderates that board and ask to be place on their service list.

OTHER LINKS TO CHEESE SITES : Here is a list of a few other cheese making sites on the web. If you find one which is particularly useful which is not on the list, [let me know](#) .

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	YOGURT MAKING ILLUSTRATED David B. Fankhauser, Ph.D. Professor of Biology and Chemistry U.C. Clermont College Batavia OH 45103	
You can use pure commercial yogurt as your starter.	First published December 1980. rev. 17 December 1993, 5 Dec 98, 11 Dec 98, 18 Apr 99, 20 Apr 99, 3 Jan 00, 7 Sept 00 File "YOGURT2000.htm" was last modified on NaN undefined NaN. This page has been accessed Counter times since 29 Dec 2003. (This page was accessed 36,147 times between 1 Sept '00 and 28 Dec '03.)	Use a "cooler" for an incubator

Introduction to Yogurt	Supplies and Equipment
Procedure (Illustrated)	Uses for Yogurt

INTRODUCTION

Yogurt is a fermented milk product which originated in Turkey in which a mixed culture of [Lactobacillus bulgaricus](#) (or occasionally *L. acidophilus*) and *Streptococcus thermophilus* produce lactic acid during fermentation of lactose. The lactic acid lowers the pH and makes it tart and causes the milk protein to thicken. The partial digestion of the milk when these bacteria ferment milk makes yogurt easily digestible. In addition, these bacteria will help settle GI upset including that which follows oral antibiotic therapy by replenishing non-pathogenic flora of the gastrointestinal tract.

Several factors are crucial for successful yogurt making:

- a. good sterile technique (i.e., proper cleansing and heat treatment of glassware, and keeping out unwanted bacteria)
- b. proper incubation temperature. *Lactobacillus* is killed if exposed to temperatures over 55°C (130° F), and does not grow well below 37°C (98°F). We will incubate at 50°C, a temperature on the high side of its preferred growth temperature (122°F), a temperature which inhibits the growth of pathogenic bacteria. (Note that many recipes call for cooler temperatures than this. We find the results less dependable when incubation temperatures are lower.)
- c. protection of the starter from contamination. Do not open the starter (either Dannon Plain yogurt, or 8 oz starter from the previous yogurt batch) until you are ready to make the next batch.

Yogurt is preserved by its acidity which inhibits the growth of putrefactive or pathogenic bacteria. With lids

intact, this yogurt will keep at least a month or two in the refrigerator. After that time, especially if your refrigerator is on the "warm" side, a layer of non-pathogenic white mold may form on the top. Merely lift off the mold with a fork, discard, and use the yogurt for cooking.

Baked goods will rise well when yogurt is used, again due to its acidity. Use yogurt as part or all of the liquid in cakes, waffles, pancakes and muffins, and cut down on the amount of baking powder. The thickness of yogurt helps to hold up the baking batter.

Yogurt is an excellent dish by itself, but is valuable in its [many other uses](#) .

The following recipe makes four quarts of yogurt. If you would like to [make 2 quarts, here is the recipe](#) . The following instructions may seem overly detailed, but I believe that the detail increases your chance of successful yogurt.

Click on a thumbnail image to see the full-sized image

	SUPPLIES	EQUIPMENT
Dannon Label:  The image shows a label for Dannon Plain yogurt. The text on the label includes: 'INGREDIENTS: CULTURED GRADE A MILK. CONTAINS ACTIVE YOGURT AND L. ACIDOPHILUS CULTURES.', 'MEETS NATIONAL YOGURT ASSOCIATION CRITERIA FOR LIVE AND ACTIVE CULTURE YOGURT', 'A COMPANY OF THE DANNONE GROUP', the Dannon logo, '© 1991 THE DANNONE CO., INC.', and 'KEEP REFRIGERATED' in red letters at the bottom.	1 gallon fresh milk (whole milk makes richer flavored yogurt, skim milk makes it non-fat) starter: 1 cup Dannon Plain yogurt, very fresh I prefer Dannon Plain, made purely with milk and culture. It WORKS. (See label at right) Others brands may work.	double boiler (or heavy pot) with lid, capacity 1+ gallon four quart jars with lids, sterilized in boiling water one 8 oz jar with lid, sterilized in boiling water. candy thermometer, reading range = -10 to 110°C (0 to 225 °F) 1 medium sized cooler (such as a "Playmate" or styrofoam with close fitting lid) (A gas oven with pilot may work if monitored closely).

PROCEDURE:



1: Sterilize jars and lids which will be used to make the yogurt. Place in a 5 gallon pot (here we are using a canner) with an inch of water in the bottom.

9: Place one cup of the scalded and cooled milk in a two cup measure.



2: Cover and bring to boil. Boil for ten minutes. Turn off heat, do not remove lid.

10: Add enough fresh, uncontaminated yogurt to bring the level up to two cups.



3: Use a pot with a thick bottom to scald the milk. [Note the thick pad on the bottom of this pot.](http://biology.clc.uc.edu/Fankhauser/Cheese/yogurt_making/YOGURT2000.htm) Alternatively, a double boiler may be used.

11: Stir to blend the yogurt starter into the scalded and cooled milk until homogenous.





4: Add one gallon of milk to the pot. You may use whole, 2% or skimmed milk. Here I am using my home grown goat's milk.

12: INOCULATE:
Add the yogurt-milk slurry slowly to the 50 C scalded and cooled milk with stirring. Stir very well to thoroughly distribute the yogurt starter.



5: Warm the milk over a medium fire (not so hot that it burns on the bottom). I am using a medium hot fire here with my thick bottomed pot.

13: Once thoroughly mixed, distribute the inoculated milk to the sterilized jars, filling to the neck. Cover immediately with sterile tops. Tighten well.



6: Heat until the temperature of the milk is 85-90 C (185-195 F). It is not necessary to boil, and do *not* let boil over... what a mess!

14: INCUBATE:
Warm a gallon of fresh clean water to 55 C, pour into a clean cooler. Place in a warm location. Carefully set the jars of inoculated milk in the water so the bottom of the lids are above the water.



7: Place the still covered pot in a pan of clean cold water to cool it down.

15: Check to see that the water in the cooler is not below 50 C (122 F) or above 55 C (130 F).





8: Cool the milk to 50 to 55 C (122-130 F). Remove the pot of scalded and cooled milk from the cooling bath.



16: Close the cooler, place in warm place and let sit undisturbed for three hours. If the starter was active and the temperature correct, the yogurt will have gelled:



For more firm yogurt, add 4 Tbl powdered milk to the gallon of milk prior to heating (step 3).

Recently, I have switched to a two gallon stainless pot with a heavy pad of aluminum on the bottom. It considerably simplifies heating the milk. So long as you heat it to 85-90°C (185-195° F) without burning, that is what is required. Once the milk has been scalded and cooled, you can even add the starter directly to the pot, and make the yogurt in the pot. It is better aseptic technique.

YOGURT HAS MANY USES:

My favorites include:

- 1) In place of sour cream. Add dollops:
to baked potatoes
on rice dishes
on bowls of soup (especially lamb stew, chili or borscht)
with hot chili (works as an oral fire extinguisher too!)
- 2) In cucumber-yogurt soup, (*khyar b'laban*) a fabulous Middle Eastern summer dish, made with yogurt, garlic, sliced cucumbers, salt to taste and topped with crushed mint. It is served chilled.
- 3) As a liquid (or portion of the liquid) in baking soda-raised breads, waffles and pancakes
- 4) As **labneh** (sometimes also known as laban, although strictly speaking, laban is yogurt), a Middle Eastern soft cheese, (an easy yogurt cheese). It can be made by hanging lightly salted yogurt in a clean cloth, permitting the whey to drip into a bowl. It is delicious served with pulverized spearmint and olive oil as a dip with lightly toasted pita bread. For illustrated instructions: [how to make labneh](http://biology.clc.uc.edu/Fankhauser/Cheese/yogurt_making/YOGURT2000.htm) .

5) As **ayran** (pronounced I-Ron), a wonderfully refreshing cold summer drink commonly consumed in Turkey where I drank it with gusto. In the words of Tekin Topuzdag, a cheese making friend in Turkey who sent me this recipe by email:

"How to make is extremely simple: Mix yoghurt with (about quarter amount of yoghurt) water and pinch of salt. Mix them well in blender (good sign of mixing is: bubbles, lots of them). Serve with ice in hot summer days."

6) As a starter for [cheese](#)

7) As a starter for yogurt (see above for how to do this)

Check any Middle Eastern cookbook for a variety of uses.

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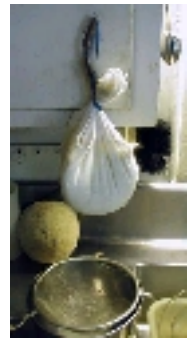
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Pouring yogurt into a sterile handkerchief

LABNEH

David and Jill Fankhauser



L: draining labneh
R: draining finished

13 March 1999, 18 Apr 99, 3 Jan 00
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This page has been accessed Counter times
since 26 July 2000.

Labneh (or Laban, as some American-Lebanese call it) is a Lebanese soft fresh cheese made from yogurt. It is eaten within a week or so of preparation. It is the easiest cheese to make that we know of, simply made by draining the whey out of yogurt. See my [yogurt page](#) for how to prepare yogurt.

INGREDIENTS:

1 quart yogurt
1 tsp salt

EQUIPMENT:

sterile handkerchief
two bowls
whisk
strainer

INSTRUCTIONS:



1. Assemble ingredients: yogurt, salt, sterile handkerchief, two bowls, whisk, strainer.



2. Stir up a quart of yogurt to a smooth consistency, pour into bowl



3. Add one teaspoon of salt



4. Whisk to mix thoroughly



5. Place a sterile handkerchief in a strainer suspended over a medium sized bowl (larger than a quart). Pour in salted yogurt.



6. Lift the four corners of the cloth to make a "sling" and suspend over the bowl to catch the whey which drips through. (I used a strong rubber band looped around the four corners and over a faucet to suspend the cloth. Some people let the whey go down the drain.)



7. Suspend over the bowl to catch the whey which drains off. It can be suspended in a refrigerator to ensure freshness.



8. After about 24 hours, the whey has been drained off, remove and open up the cloth.



9. Here is the finished labneh on the draining cloth.



10. Finished labneh, molded into a ball. Store in the refrigerator.

USES :

Serve Labneh as they do in the Middle East:

1. form into desired shape on a plate (a slight depression in the middle holds the oil)
2. drown in olive oil
3. sprinkle with pulverized spearmint
4. surround with Greek black olives.

Eat it with toasted pita bread slices, as the Arabs have done for millennia. Coffee compliments it well.

You can also use it like a slightly tart cream cheese.

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NEUFCHATEL

AN UNRIPENED CHEESE

David B. Fankhauser, Ph.D.
Professor of Biology and
Chemistry
U.C. Clermont College
Batavia OH 45103



Adding rennet to inoculated milk

This page has been accessed
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2000.

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First posted 22 December 2000

Finished molded neufchatel

This soft unripened rennet cheese is originally from the town of Neufchâtel in the region of Normandy, but is made extensively throughout France. It is reported in the Encyclopedia Britannica to be the same as Bondon, Malakoff, Petit Carre, and Petit Suisse, depending on the shape into which it is molded (square, rectangular, cylindrical and the special heart-shape variety called Coeur de Bray.) It is easy to make, and may be used like cream cheese. A version common in the United States is so-called "[Farmer's Cheese](#)."

Being easy to make, it is the most common style of goat cheese to be found in the American marketplace. For that reason, many people only think of it when they hear "goat cheese." It should be used fresh, as it may develop an off flavor after storage of several weeks. Similar to cream cheese, and a less tart version of labneh, a yogurt cheese of the Middle East, its mild flavor makes it ideal for use where the flavor of other ingredients are to be emphasized. Indeed, many home cheese makers like to add herbs or seasonings to their neufchâtel to personalize their own cheese. I still prefer the pure unadulterated version which can be seasoned just prior to serving.

Click all images to enlarge.

TO MAKE 1 TO 1.5 POUNDS OF NEUFCHATEL:

EQUIPMENT	SUPPLIES

5 quart stainless steel pot with lid
(sterilized by boiling water in it for 5 minutes prior to use)
thermometer reading in the 50-100°F range
sterile clean handkerchief
large strainer or colander

1 gallon fresh whole milk (store-bought may be used)
(Use skimmed milk for low fat but less flavorful cheese)
1/4 cup cultured buttermilk
(or 2 ice cubes of frozen buttermilk)
1/4 tablet Rennet



1. Assemble ingredients: fresh milk, buttermilk (in this case, frozen cubes of buttermilk, but fresh cultured buttermilk works perfectly). The pot has been sterilized by covering and boiling a small amount of water for five minutes. I am using my fresh goat's milk, but store-bought whole, partially skimmed or skimmed will work. The less cream, the less rich and full bodied flavor you get.



2. Add buttermilk to milk in a pre-sterilized 5 quart stainless steel pot. Here I add two "ice cubes" of frozen buttermilk, but 1/4th cup fresh cultured buttermilk works very well. If using ice cubed starter, stir until completely melted.

Warm with stirring to a final temperature of 65°F.



3. Meanwhile, dissolve 1/4 tablet rennet in 1/4 cup cool water. (If you use liquid rennet, use four drops/gallon. Be sure it is not outdated.)



4. The rennet is now dissolved. Note that it will be slightly turbid, but there are no remaining pieces on the bottom of the glass.



5. Add the dissolved rennet into the 65°F inoculated milk with stirring.



6. Stir well to blend thoroughly.



7. Cover and let sit *undisturbed* overnight at room temperature (65-70°F, 20°C).



8. The next AM, a soft curd should have formed. (If not, let sit until it *does* form. In the illustration, the curd was NOT adequately formed, and I let it sit for another 12 hours... Here is a page on [troubleshooting failure to get a clean break](#)) When curd is adequately formed, cut it into ½ inch cubes. [Here is a picture of [curds being cut](#) .] Some recipes call for stirring the soft curd instead of cutting. I suspect this would make the separation of curds and whey more difficult. Ladle cut curds into a clean sterile handkerchief suspended in large strainer or stainless steel colander. Pour the remaining whey through the cloth. If the cloth becomes clogged, lift the cloth back and forth or scrape the forming cheese away from the cloth.



9. Hang the curd in a cool place to allow the whey to drip out: pick up the four corners of the cloth, wrap a heavy rubberband around, and loop one end through the other end. Insert a chopstick through the open end, and suspend the cheese bag over a receiving vessel to catch the whey. Here, I have hung the cloth in our "milk" refrigerator. Let hang over night.



10. The next day, open the cloth to reveal the cheese.



11. This is what the cheese looks like turned over.



12. Sprinkle on 1- 2 teaspoons of salt, according to taste. Inadequately salted cheese will be more bland, and will not keep as well. Work to mix the salt in thoroughly. Store covered in the refrigerator until use. Recycled cottage cheese containers work well for this.



13. If you like, you may pack the cheese into a mold of your choice (a squat tin can with the ends removed, in this case).



14. Here the cheese has been removed from the tin can mold, showing its "molded look."



15. Here is the unmolded cheese displayed on a decorative plate.

This soft fresh cheese is easily made into a seasoned spreadable cheese. I love to mix in crushed garlic, for instance. It can also be used with success in cheese cake. Try folding it in with scrambled eggs.

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How to Make Farmer's Cheese

©David B. Fankhauser, Ph.D.,
Professor of Biology and Chemistry
University of Cincinnati Clermont College,
Batavia OH 45103

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This page has been accessed Counter times since 9 March 2001.

Created 15 February 2001

This simple cheese has several aliases. Two common ones are **soft farmer's cheese** and "**chevre**." They both are rather loose names. "Farmer's cheese" can refer to any of a number of different soft home-made cheeses which are eaten fresh. "*Chevre*," which actually means goat, could refer to many different cheeses. This recipe for "Farmer's Cheese" is nearly identical with [Neufchatel Cheese](#), the recipe for which I posted some time ago on my [Cheese Page](#).

I have modified this recipe from one I got from Julia Farmer a year or two back. She states that she got it from a book by Jean-Claude Le Jaouen, but did not mention the name of the book.

INGREDIENTS:

Two gallons goats milk
1/4 cup cultured buttermilk
½ tablet Rennet (or two drops of liquid rennet)

PROCEDURE:

1. Warm milk to [room temperature \(68-70°F\)](#)
2. Dissolve [1/2 of a rennet tablet in 1/4 cup luke warm water](#).
3. Stir in buttermilk, mix thoroughly.
4. [Stir in rennet](#), mix thoroughly, cover, let sit for 24 hours.
5. Check for [clean break](#). The curd should be firm enough to [cut into 1/2 inch cubes](#) (see page on [Making 5 gallons of milk into cheese](#) for pictures). Some recipes call for stirring the curds into a slurry, and pouring into a fairly tight weave bag to drain. However, if the weave is too loose, such as with a single layer or two of cheese cloth, the fine curd will run through at first. I far prefer to cut the curd as it makes for more easily separated curds and whey.
6. ladle the curds into a sterile cloth in a strainer (or colander), and [suspend in a refrigerator](#) or cool place.

7. Let the whey drain for 24 hours in a cool place.
8. [Salt to taste](#) (about 1-2 teaspoons), store covered in the refrigerator for a week or two. This cheese will not keep for much longer.

Julia Farmer further says that you can

- press into small cheese molds for little cheeses
- roll them in ashes, place in a jar with garlic and herbs, cover with extra virgin olive oil
- Use it in cheese cake
- whip the cheese up with some powdered sugar, vanilla extract and a bit of lemon juice until its well blended and then serve as dessert with sliced strawberries over the top.

or...

- "You can add a pinch of penicillium mold with the starter and cure them at 50°F for a Brie/Camembert clone." I have not tried that one yet, but have made [Blue Cheese with these curds](#) with great success.

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	CHEESE MAKING ILLUSTRATED ©David B. Fankhauser, Ph.D., Professor of Biology and Chemistry University of Cincinnati Clermont College, Batavia OH 45103	
decanting whey from the curds	This page has been accessed Counter times since 26 July 2000. rvsd 14 October 1991, 20 Sept. '94, 23 Sept. '96, 14 Sept 99, 4 Oct 01	pressing the cheese in a home-fashioned press

How to make cheese at home.

This recipe for a basic hard cheese works for any kind of milk. Iprimarily use my own fresh goats' milk, but have made it quite successfullywith cow's milk purchased from the grocery as well as raw cow's milk froma local farmer. I always use [rennet tablets becauseof their dependability and availability from many supermarkets](#) . I usually make 5 gallons of milk into cheese at a time in a 5 gallon Volrath stainless steel pot. Its thick aluminum bottom pad prevents scorching. Five gallons of milk produces a [5-6 pound wheel of cheese](#) .

I suggest you try several other simplier cheese related projects beforeyou try making a hard cheese. I have written a page on [Beginning Cheese Making](#) for this purpose. It might also be wise to master [the process for one gallon of milk](#) before making cheese from 5 gallons.

The following images will show the critical steps in practically any cheese making endeavor.

INGREDIENTS:

TO TURN FIVE GALLONS OF MILK INTO SIX POUNDS OF CHEESE

five gallons fresh milk (Be sure that it has no off flavors due to bacteria)

2 cups live cultured yogurt (I prefer Dannon Plain. Get the freshest available from the store.) Alternatively, you may use 1/2 cup active cultured buttermilk as starter.

1 tablet rennet "[Junket Rennet Tablets](#)" come in a package of 8 tablets (6.5 g) , by Redco



Foods, Inc., P.O. Box 879, Windsor, CT 06095 (formerly the Salada Foods Division). Here is [what the back of the](#)

[package looks like](#) . They can often be found in your supermarket under the category of "puddings." If they are not there, ask the manager if he would please order them. Most

managers are willing to do so. If that fails, you can order them from the manufacturer. I recently contacted them via email, and they said to call Redco Direct Market at **1-800-556-6674** to order Rennet tablets. [Here is their email response](#). You may find some cheese makers on the web who prefer liquid rennet, and disparage the use of rennet tablets. I prefer using materials which are readily available locally. I have not had problems making cheese associated with Junket tablets. Here is a whole [page devoted to rennet](#) ...

1/4 cup salt

APPARATUS:

thermometer, reading -10 to 110°C (0 to 225°F) (I prefer centigrade, but include Fahrenheit numbers as well)

wooden mixing spoon or whisk

Stainless steel pot (with a heavy thick bottom is best) or enameled pot, 5 gallons, with lid, sterilized. ¹

8" strainer (You may use a colander, though the whey does not flow through as fast as a strainer.)

PRESSING FRAME: (Here is a page on how to [assemble a cheese press at home](#) .)

pressing frame (6" x 9" piece of PVC pipe or tin can, with ends removed)

a 'follower': circular block of wood, 5.5 inches diameter

5 gallon canner

large white dinner plate

white dish cloth (non-terry), very clean

rubber band cut from an inner tube

two chop sticks

quart mason jar

PROCEDURE:



THE NIGHT BEFORE YOU MAKE CHEESE:

1.a. **Sterilize the pot:** The evening before you plan to make cheese, place a small amount of water in your cheese pot, cover, and heat to boiling for 10 minutes to sterilize the pot and lid.

1.b. **Warm 5 gallons of milk to 20°C (68°F)** in a sterilized pot: skim the cream off of **five gallons of the freshest milk** (save for [ice cream](#)). Warm the milk to 20°C (68°F) slowly so as to not scorch the bottom).



2. **Add starter:** [Blend 2 cups yogurt with 2 cups warmed milk](#) until smooth, stir into the five gallons of warmed milk to thoroughly mix.

Alternatively, you can use **1/2 cup of active buttermilk** as starter. Because the bacteria in buttermilk grow much faster at room temperature than those in yogurt, do not incubate longer than 8 hours or warmer than 70 F or the milk may over acidify and begin to clabber. Partially clabbered milk will not yield a clean break.

The function of this inoculation with bacterial starter is to lower the pH so that the rennet will be able to act on the milk protein (casein).



3. **Cover with the sterilized lid.**

Let the inoculated milk sit at room temperature overnight (68-72 F, 20-22 C). (No external heat.)



THE MORNING YOU WILL MAKE CHEESE:

4. The next morning, [skim off additional cream](#) (if you like, it makes delicious pancakes) slowly warm milk up to 30°C (86° F). Take care not to scorch it on the bottom.



5. Dissolve the rennet:

Meanwhile, dissolve **1 tablet of Rennet in 1/2 cup cold water** .

Alternatively, if you have liquid rennet, you add 1 teaspoon per five gallons of inoculated milk (4 drops/gallon). (I have only used tablet rennet, but am assured that liquid rennet works just as well if fresh.)



6. **Add dissolved rennet to warmed milk** with stirring to mix. Cover, let sit *undisturbed* for 1 to 3 hours.



7. TEST FOR A "CLEAN BREAK."

THIS IS NOT A "CLEAN BREAK":

To test for "**clean break**" (completed action of rennet), probe a clean finger into (hopefully) gelled milk and lift. If the gelled milk is not firm enough to split cleanly as you lift, let milk sit until clean break is obtained. (*Do not stir.*) This may take as long as 3 hours. Be patient, do NOT disturb the milk. Keep warm. Here is a page to help you [diagnose the problem of inability to get a clean break](#).



8. THIS IS A "CLEAN BREAK"

When the gel is firm enough to break cleanly as the finger is lifted, go to next step. ([Here is a very large version of the clean break](#) .)



9. Once a clean break is achieved, cut the curd with a long blade:

Begin the cuts at one edge of pot, cut straight down the side to bottom. Cut repeatedly parallel to first cut, but increasing the angle of the knife until you reach the other side of pot.



10. Rotate the pot 90 degrees, repeat series of cuts as before.

Rotate and cut a total of three more times (four in all), yielding $\frac{1}{2}$ inch cubes of curd. Cover and allow the curds to settle for about 15 minutes. Pour off the whey above the curds, saving for ricotta if you like.



11. "Cook the curds": After sitting for 15 minutes and pouring off excess whey, place pot over a low fire, stir curd with thoroughly cleansed bare hand by reaching down to bottom, gently lifting with an open hand to stir. Cut larger curds as they appear. Do not mash or squeeze. If you want to set aside some for a type of cottage cheese, remove a portion of the curds at this step and refrigerate before you raise the temperature. Stir continuously as you heating (curds will clump together otherwise), until the milk is 34°C (95°F) for soft curd cheese, or as high as 39°C (102°F) for very firm cheese. Note: you need a quality thermometer for this 'cooking' step: a small change in temperature makes a great deal of difference in the consistency of the curd/cheese.



12. Stir and maintain desired temperature until curd has contracted to consistency of firm scrambled eggs. Remove from stove.



13. Separate the curds from the whey:

Let the "cooked" curds sit for a few minutes. The curds should sink in whey. [If [the curds float](#) , you have a gas-producing contaminant in your starter. It does not necessarily ruin the cheese, indeed, you might WANT bubbles in your finished cheese. Butfloating curds are more difficult to separate from the whey than sinking curds.]

Decant off whey through a strainer (you may line the strainer with clean cloth if the curd is very fine grained).



14. Decant (pour off) as much of the whey as you can. Drain well.

(Save the whey for [ricotta](#) if you like.)

15. Place curds in a large bowl.



16. Salt the curds:

Sprinkle **1/4 cup salt** over curds, working with hands to mix. Pour off accumulated whey.

The salt is necessary so that the cheese will not spoil as it cures. I have tried making cheese without salt and it rotted. However, unsalted, uncured cheese may be frozen until use.



17. Load the press with the salted curds:

Place the still-warm salted curds into a cheese press. (See separate page for [assembly of cheese press](#) .)

It is necessary for the curds to be warm in order for them to 'knit' together to form a solid cheese during pressing.



18. Press the curds:

Let sit in the press for 12 hours or so.

19. Remove the cheese, wrap in sterile bandage:

The next AM, remove from press, remove cloth, rub outside of cheese with salt and wrap with fresh sterile handkerchief "bandage."

20. Age to develop a rind:

Place the bandaged (wrapped) cheese on a non-corrosive rack (plastic or stainless steel) in the refrigerator. Replace "bandage" daily as long as it continues to become wet. Turn the cheese so that it dries evenly.

21. Wax the cheese

When the cheese has formed a dry yellowish rind (two or three weeks), [dip in melted wax](#), store in refrigerator for at least a month (if you can wait that long). Let age longer for sharper cheese.



Here is the finished wheel of cheese two weeks later with a wedgecut out of it. I did not wax this wheel since we were going to eat it immediately. [The stains on the outside of the wheel are from being in the iron ("tin" can) press too long: it remained in the press for 30 hours, and the iron in the can reacted with the curd... Though I do not think it to be a problem health-wise, it doesn't look as good as it might otherwise look. I have since switched to a pressing cylinder made of PVC pipe].

¹ Avoid aluminum pots, the acid will dissolve them. Sterilize the pot just before use by placing ½ inch of water in the bottom, covering, and bring it to a rolling boil, [continue heating for five minutes after steam shoots out from under the lid \(although the steam is not clearly visible in this jpeg\)](#). Pour out the water, replace sterile lid, keep sterilized pot covered until you are ready to add the milk.)

AMERICAN MOZZARELLA: MICROWAVE á la JOYCE

revised 25 May 99, 27 May 99, 28 July 00

This page has been accessed Counter times since 26 July 2000.

I modified this cheese from one I learned from "[Joyce of KS](#)" on the old Lactobacillus Board on the web (now [Countrylife.net](#)). It makes an "American mozzarella" similar to what is used on American pizza. It is very elastic, melts well and strings when hot. (It is not, however *Italian mozzarella* which is more tender at room temperature and possesses a more subtle flavor.) If you would like to make the Italian version, here is a recipe for making [Italian fresh mozzarella](#) which, as you will see is more complex than this one for "American" mozzarella.

My [video page](#) shows clips of the "clean break," and "cutting the curd."

EQUIPMENT:

- 1 cup pyrex measuring cup
- 2 cup pyrex measuring cup
- 5 quart pot, stainless or enamel, with cover
- Small skillet (2 inches smaller than diameter of above pot)
- Thermometer, -20 to 110C
- Sterile fine-weave dish cloth
- 8 inch strainer
- 1000 watt microwave oven

INGREDIENTS:

- 1 gallon milk (I used cow's milk, homogenized, pasteurized, 3.5% butter fat)
- 1¼ teaspoon citric acid powder (from local pharmacy) dissolved in ½ cup cool water
- ½ tablet [Junket rennet](#) (from local supermarket) suspended in ¼ cup cool water

- Dissolve 1¼ tsp. citric acid powder into ½ cup cool water. Add to milk and stir well. Heat milk to 31C (88F) over boiling water in a small skillet.
- [Dissolve ½ tablet Junket Rennet into ¼ cup cool water](#). Stir thoroughly into warmed milk mixture. Let set undisturbed for 1-2 hours, until a [clean break](#) is achieved.
- [Cut curd](#) into ½ inches cubes.
- Over low heat, stir the curds and whey gently to keep the curds separated and temperature uniform until temperature reaches 42C (108F). Hold at 42C (108F) for 35 minutes, stirring every five minutes to keep curds separated and off the hot bottom.
- Collect curds by pouring curds and whey through a fine cloth held in an 8 inch sieve over same covered container, let drain for 15 minutes. Save whey to make [ricotta](#) (You bring

the acidified whey to 95C, cool, filter particulates).

- Break up curd, thoroughly mix in 1 teaspoon salt.
- Place 1 cup salted curd into 2 cup measure.
- Microwave on high (1000 watts) for 45 seconds (adjust the time so that you get the desired elasticity). Separate hot curd from container with the back of a fork, knead with hands to distribute heat evenly. Stretch and fold to make smooth and elastic, shape into a soft ball, pinch, place in refrigerator to solidify.

Return to [Fankhauser's Cheese Page](#)

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MOZZARELLA

David B. Fankhauser, Ph.D.
Professor of Biology and
Chemistry

University of Cincinnati
Clermont College
Batavia OH 45103

3 July 1998, 1 August 1998, 6 Dec 98,
15 June 2000

This page has been accessed

Counter times since 26 July
2000.



I do not yet consider that I have perfected my mozzarella to approach that which I have had in Italy, but the following recipe makes a fine tasting, tender, succulent approximation. Of course, *they* make theirs with water buffalo milk, which HAS to make a difference. The critical step is to get curds acid enough to "spin." I have had problems getting it to spin in the past, mostly (I believe) because the curd had not acidified enough. This recipe makes delicious mozzarella when proper spin is achieved. When it hasn't spun, the cheese is still good, but not what I was hoping for... I am eager to hear any improvements which you may offer to improve the process and/or product.

Ingredients:

1 gallon fresh milk (I use goats' milk. The classic Italian calls for water buffalo milk (!), but cow's will do.)
3 Tbl fresh yogurt starter (Dannon plain)
3 Tbl fresh cultured buttermilk
1 tablet Junket rennet
salt

Apparatus:

stainless steel pot with cover (about 1.5 gallon capacity)
(sterilized by boiling a small amount of water until steam rushes out from under the lid.)
Dependable thermometer, range 0-100°C (32 - 212°F)
Whisk
long bladed knife for cutting curd
table knife for finishing the cutting of the curd
colander
shallow glass baking pan

Slotted spoon

1. [Warm milk to 32°C](#) in sterilized stainless steel covered pot . Meanwhile, [dissolve rennet in 1/4 c water](#).
2. [Blend yogurt and buttermilk](#) together, [add a small amount of milk](#), whisk into 32°C milk.
3. [Stir in dissolved rennet](#) thoroughly, cover, [let sit in warm spot until gelled \(clean break\)](#), about 45 minutes.
4. [Cut curd with clean knife into ½ inch cubes](#). (See my protocol for [basic cheese](#), steps 9 and 10 for precise instructions on cutting the curd).
5. Re-warm to 32°C with stirring, [cutting larger chunks of curd into smaller pieces with table knife](#). [Let sit 15 minutes](#).
6. [Pour off whey](#) (save for ricotta), [add curd to 2 qts cold water](#) to rinse, [drain in colander](#).

CRITICAL STEP FOR PROPER "SPINNING" OF THE CURD:

7. [Let sit at room temperature](#) to develop acidity. The last two times I have made it, I let it sit overnight, and it was ripe for "spinning." The final pH should be 5.3. You can monitor the acidification using pH paper with a range of about 4.8 to 6.2. (It might be ready in only 5-10 hours, but with goat's milk, overnight has worked best for me. You can tell that proper acidity is achieved when the curd, upon heating, "spins."

Checking for proper acidity using the "spinning" technique:

- a) Heat 2 c water to 85°C.
 - b) [Drop several chunks of curd in](#), stir gently with a fork.
 - c) Test for acidity by pulling and folding the hot curd. If it [softens and draws into strings](#) ("spins"), and appears glossy on the surface, it is ready. If it [breaks when you pull it](#), let sit several more hours until it does.
8. Once the curd will "spin", [break or cut up the curd](#) into pieces about ½ inch diameter. Place cut curd back in shallow glass baking pan.
7. Heat ½ gallon water to 85°C.
8. [Pour heated water over the curd, and stir with a slotted spoon](#). The temperature of the water should drop no lower than 57°C, but should not go above 60°C. As the curd warms, it should become more

elastic, and finally "spin."

9. [Press or cut the hot cheese into pieces](#) (*mozzato* in Italian) and form into balls about the size of a lemon (size depends on how you wish to use it. In Italy, they are most often about 2 inches in diameter). [Stretch and fold over and over on itself](#) to form thin layers. [The balls should be glossy and smooth](#) on the outside. Here is a [finished ball of mozzarella](#).

10. [Plunge into cold salted water](#) (1 Tbl salt/quart) and store in the refrigerator a few hours to firm up. It may be stored for several days in this brine, but is best when it is freshest.

Ideally, when freshest mozzarella is cut, the thin "onion-like" layers of stretched should be visible, surface smooth and tight and a texture between rubbery and soft. The "onion" layers disappear after less than a day after making.

I believe that the problems I have had making mozzarella are primarily due to insufficient acidity in the curd. The result is a tough, rubbery mozzarella.

You may know that the classic and simple Neapolitan service of this delicious cheese is to slice it, and serve on slices of fully vine-ripened tomato slices, drizzled with olive oil and then balsamic vinegar, and finally sprinkled with fresh basil, salt and freshly ground pepper.

For further information, see:

Kitchen Cheesemaking by Lue Dean Flake, Jr, Stackpole Books, (1976), p. 72.

"Mozzarella," in *La Cucina Italiana*, Vol 2, p. 36 (August 1997)

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BLUE CHEESE

David B. Fankhauser,
Ph.D.
Professor of Biology
and Chemistry
U.C. Clermont
College
Batavia OH 45103



Creating air holes

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accessed Counter
times since 11 May
2001

Finished blue cheese

I developed this recipe to try to duplicate an excellent blue cheese available in the United States called "Saga Blue." It starts with a simple "[Farmer's Cheese](#)" ([Neufchâtel](#) should also do fine as a starting curd). An inoculum of *Penicillium* from a cheese you are duplicating is added to the curd, and aeration holes are created so that air can enter the cheese. Temperature and humidity need to be controlled so that aging proceeds at the correct rate, and the cheese does not dry out, nor "weep" with moisture.

I have adhered to my principle of trying to keep the equipment and materials as simple and readily available as possible, so I hope you won't mind, for instance, using a phillips screwdriver to create the holes in the curd...

I will be adding more pictures to this recipe in the future, so request clarification where you think it needs it, and check back for further development of the page.

Click all images to enlarge:

EQUIPMENT	SUPPLIES

blender (suspending inoculum can be done by hand)

[cheese press](#)

sterile clean handkerchiefs (sterilized by boiling water in it for 5 minutes prior to use)
thermometer reading in the 0-40 C (50-100 F) range

large philips screwdriver or other sterilizable rod

"Cool box" (refrigerator set to 10 C (50 F)

Drained curds from "[Farmer's Cheese](#)"

1 teaspoon of uncontaminated "Saga Blue" cheese (or other selected blue cheese to use as an inoculum)

PROCEDURE FOR MAKING BLUE CHEESE



1. Start with cold drained curds from "[Farmer's Cheese](#)" made from two gallons of milk. (It was drained in the refrigerator)



2. Sprinkle on 2 teaspoons of salt, mix in to form pea-sized crumbles.

3. In a blender, blend 1 teaspoon of uncontaminated blue cheese (I used "Saga Blue") with 1/4 cup of cool clean water to create a smooth suspension of cheese (the inoculum).

4. Pour the inoculum over the salted curds, toss to mix thoroughly.

5. Line the press with a sterile handkerchief (sterilized by boiling), and load the curd. Press lightly so that the curd are not compressed together, but instead retain air spaces within the cheese.

6. Leave in the press overnight



7. The next morning, remove from the press, and create air hole by inserting a sterilized rod, about 1/4 inch in diameter (6 mm) through the cheese every inch or so. This is to allow air to enter the cheese which is necessary for growth of the mold. [I used a phillips screwdriver which had been dipped in Vodka. One could also boil to sterilize. You do NOT want to introduce bacterial contamination in these air holes.]



8. Rub the surface lightly with salt, and place the aerated cheese on a dry sterile handkerchief. Fold the cloth over to lightly cover.



9. Place on a non corrosive rack to encourage air circulation around the cheese.



10. Place the cheese on the rack in a "cool box" which will hold the temperature around 10 C (50 F). Here I am using a refrigerator in our basement which stays around this temperature during the late winter when I made this cheese. If you can turn the thermostat high enough to maintain this temperature, that will work fine.



11. Monitor the temperature and humidity. The temperature should be around 10 C, and the humidity around 70%. You can elevate the humidity with a pan of water in the bottom of the "cool box." Since the cheese will be aged unwaxed, this high humidity is important so that the cheese does not dry out. On the other hand, if it is "dripping wet" so that the cheese "weeps," the cheese will spoil.

12. Turn the cheese daily, replace the handkerchief with a dry sterile one if it appears wet.

	13. After a week or ten days, a white "bloom" appears on the surface of the cheese. Note that the holes I made are filled with the bloom. They should have been larger so that air would not be excluded from the interior of the cheese. Indeed, after a month and a half, the outside had developed a white with green bloom, but the interior (I cut it open), lacked any green. I replaced it in the "cool box" and within two weeks, the interior exhibited the characteristic coloring.
	14. Here is the finished blue cheese after two months. Note the marbling of the interior with Penicillium. It could doubtless be aged longer, but it is utterly delicious as it is.
	15. Here is a closer look at the bloom on the rind, and the appearance of the sliced cheese. Wish you could taste it.

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	FRESH MOZZARELLA FROM A GALLON OF MILK	
pour 85 C water over the curds to meld them together	This page has been accessed Counter times since 27 October 2003. File "Pasta_Filata.html" was last modified on NaN undefined NaN. First on the web on 27 October 2003	the hot curds blend together and are shaped into balls

This is a recipe to make a fresh mozzarella which I have developed from a recipe for pasta filata (a type of cheese of which mozzarella is one example) found on an [Kenyan Cheesemaking site](#) . The modified recipe is more straightforward, easier, and more dependable than the traditional [Italian Fresh Mozzarella](#) I posted on the web in the Summer of 2000. It requires preparation of the curd the night before, allowing the curd to mature in a warm place overnight, and then warmed and molded the next morning.

There are six stages to making this mozzarella, many of which follow the general outline of most cheese preparation:

I. INOCULATION	bacterial starter is added to slightly acidify the milk so rennet works
II. COAGULATION	rennet is added which causes acidified milk protein to coagulate
III. CUTTING THE CURD	curd is cut to allow the whey (liquid remnant of milk) to be expressed
IV. ACIDIFICATION	curds are kept warm for 8 hours, allowing bacteria to further acidify

V. MELTING	acidified curds are stirred with hot water causing them to melt together
VI. MOLDING AND BRINING	the soft curd mass is kneaded into balls, cooled and placed in brine

INGREDIENTS AND EQUIPMENT

	Ingredients	Equipment
Day 1:	1 gallon fresh milk 1/4th cup cultured buttermilk ½ tablet rennet	1 ½ gallon pot with thick heavy bottom and well fitting cover sterilized by boiling 1/2 inch water covered, 5 minutes thermometer, 0-110 C (32-230 F) whisk long bladed knife
Day 2:	½ gallon 85 C water ½ gallon ice water 1/4 cup salt	1 gallon bowl ½ gallon jar with lid slotted spoon

I. INOCULATION



- In the early evening, warm one gallon fresh milk to 35 C (95 F) slowly enough so it does not burn on the bottom. (Note that the pictures were taken when I made the cheese on a slightly different schedule than the one I prefer and describe here.)
- Blend in 1/4th cup cultured buttermilk thoroughly with a whisk. Be sure to use fresh, active cultured buttermilk. Either purchased, or [home cultured](#) will work if it is active (bacteria are live and well).



c. Let sit 15 minutes to allow the bacteria to "wake up."

II. COAGULATION



a. Meanwhile, dissolve $\frac{1}{2}$ tablet rennet in $\frac{1}{4}$ th cup cool water. It will be slightly cloudy, but no chunks on the bottom.



b. Stir dissolved rennet into inoculated milk, whisk to mix thoroughly, cover, place in a warm, protected spot.



c. Let sit *undisturbed* in a warm place for approximately 2-3 hours until it displays a clean break. (See [basic cheese page for demonstration of a clean break](#) . NOTE: If you disturb the milk during this time, you will have [problems getting a clean break](#) .)

III. CUTTING THE CURD



a. After two hours, test for a clean break. Do not proceed to the next step until you DO achieve a clean break. DO NOT DISTURB...

(see [basic cheese page](#) step 7 for details. If you have [problems achieving a clean break, here is a page to diagnose the problem](#) .)



b. Once a clean break is achieved, cut the curd into $\frac{1}{2}$ inch cubes.

(see [basic cheese page](#) steps 9 through 11 for technique).



c. Stir up cut curds gently with a clean hand, cutting pieces larger than $\frac{1}{2}$ inch cubes into smaller pieces. Let sit 15 minutes with occasional stirring.



d. Pour off whey which has come to the surface (about a quart, save for [ricotta](#) if you like).



e. Warm curds to 36 C (97 F) with gently constant hand stirring. It should never feel hot at the bottom.

IV. ACIDIFICATION



a. Replace the cover and let the 36 C (97 F) curds (and remaining whey) sit in warm place overnight (at least 8 hours).

Here I have place it on top of a slightly warm wood stove, buffering the temperature with a larger pot of water. I have also had success by placing the curds in front of the refrigerator fan which blows warm air. Be sure the pot is securely covered.

V. MELTING



a. The next morning, test for proper 'spin' of the acidified curd by dropping a few pieces of curd into 85 C (185 F) water, stirring with a fork, and testing to see if it 'spins:' pulls like taffy. If it breaks apart when you pull it, let the curds sit additional hours until it does 'spin.'



b. Once it spins, warm ½ gallon fresh water to 85 C (185 F).



c. Meanwhile, pour off all the remaining whey from the curds and whey. (Save a pint of the whey for acidified brine (below, step VI.d.) and the rest for [ricotta](#)).



d. Break the curd mass into small pieces with your hands. (Here I have put it in a colander to ease draining the curd. If you carefully perform the previous step to drain all easily drained whey, a colander is unnecessary.)



e. With the broken up curds in the 1½ gallon pot, pour the ½ gallon 85 C (185 F) water over the curd pieces, stir with a slotted spoon until it forms a gummy mass. The temperature will drop to about 55-60 C (130-140 F).

VI. MOLDING AND BRINING



a. Stir the curd in the hot water so that it comes together to form a gummy mass, pressing and folding with the spoon.



b. Pinch off lemon sized pieces of the hot dough-like cheese, fold over and over on itself to form a smooth ball. Briefly replace in the 85 C (185 F) water to soften, and mold to even out the smoothness of the ball. (I could have worked the curd a little longer to meld it together more smoothly in the picture at the left.)



c. Drop smoothed ball into iced cold water to firm up the ball. Repeat the shaping of balls for the rest of the curd. You should get about four 4-5 ounce balls from a gallon of milk.



Not much to see here... the formed balls are chillin' in iced cold water.



d. Prepare brine: in a $\frac{1}{2}$ gallon jar, dissolve $\frac{1}{4}$ cup salt in 1 pint fresh cool water plus 1 pint of whey (from step V.c.)

e. Drop the cooled mozzarella balls in the brine, cover and refrigerate.

f. After 12-24 hours, remove from brine, place balls in zip lock bags until used. (Do not leave too long in the brine, or the surface will soften.)

g. Use within several days or a week of preparation. Fresher is better.

Here are [additional pictures taken of the process](#) , but not used in construction this page.

Created using [Thotor - Photo Thumbnail Generator](#) !



AMERICAN MOZZARELLA MICROWAVE á la JOYCE

©David B. Fankhauser, Ph.D.,
Professor of Biology and Chemistry
University of Cincinnati Clermont
College,
Batavia OH 45103



The ingredients include
citric acid for acidification

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This illustrated page has been
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2007.

The [previous version of this page](#) has been
accessed Counter times since 26 July 2000.
revised 25 May 99, 27 May 99, 28 July 00

A microwave is used to
soften the cheese for molding

I modified this cheese from one I learned from "[Joyce of KS](#)" on the old Lactobacillus Board on the web (now [Countrylife.net](#)). It makes an "American mozzarella" similar to what is used on American pizza. It is very elastic, melts well and strings when hot. (It is not, however *Italian mozzarella* which is more tender at room temperature and possesses a more subtle flavor.) If you would like to make the Italian version, here is a recipe for making [Italian fresh mozzarella](#) which, as you will see is more complex than this one for "American" mozzarella.

My [video page](#) shows clips of the "clean break," and "cutting the curd."

EQUIPMENT:

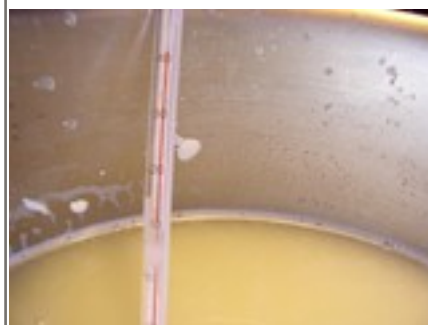
- 1 cup pyrex measuring cup
- 2 cup pyrex measuring cup
- 5 quart pot, stainless or enamel, with cover, preferably with a thick heat dispersing bottom
- Thermometer, -20 to 110C
- 8 inch strainer
- 1000 watt microwave oven

INGREDIENTS:

1 gallon milk (I used cow's milk, homogenized, pasteurized, 3.5% butter fat)
 1¼teaspoon citric acid powder (from local pharmacy) dissolved in ½cup cool water
 ½tablet [Junket rennet](#)(from local supermarket) suspended in ¼cup cool water



1)
Assemble
the
ingredients
listed.



12) Over
low heat,
stir the
curds and
whey gently
to keep the
curds
separated
and
temperature
uniform
until
temperature
reaches 42
C (108 F).



2) Warm
milk to 31
degrees C
(88 F)
either in a
thick
bottomed
pot, or else
in a double
boiler (or
place the
pot over
boiling
water in a
small
skillet.)



13) Hold at
42 C (108
F) for 35
minutes,
stirring
every five
minutes to
keep curds
separated
and off the
hot bottom.



3) Measure out 1 and 1/4 teaspoon of citric acid, dissolve in 1/2 cup cool water.



14) Collect curds by pouring curds and whey through a fine 8 inch sieve over a 1.5 gallon container, let drain for 15 minutes. Save whey to make [ricotta](#) (You bring the acidified whey to 95C, cool, filter particulates).



4) Dissolve the citric acid.



15) Place curds in a stainless steel bowl.



5) Stir citric acid into warmed milk.



16) Add one teaspoon salt

	6) Break a Junket rennet tablet in half.		17) Mix in the salt into the curd.
	7) suspend the 1/2 tablet of rennet in 1/4 cup cool water		18) Place 1 cup salted curd into 2 cup measure. Microwave on high (1000 watts) for 45 seconds (adjust the time so that you get the desired elasticity).
	8) Stir suspended rennet solution into warmed, acidified milk.		19) Separate hot curd from container with the back of a fork, knead with hands to distribute heat evenly.

	9) Allow to set for one to two hours, <i>undisturbed</i>, until a clean break forms.		20) Stretch and fold to make smooth and elastic, shape into a soft ball, pinch, place in refrigerator to solidify.
	10) Cut the curd as specified in the basic cheese protocol.		21) Three four ounce balls of mozzarella are produced from this recipe.
	11) Stir the cut curds, cut large pieces to 1/2 inch cubes.		

Created using [Thotor, Photo Thumbnail Generator!](#)

MAKING SWISS CHEESE

David B. Fankhauser, PhD
Professor of Biology and Chemistry
University of Cincinnati Clermont College
Batavia OH 45103

Modified 1 Jan 2004

This page has been accessed Counter times since 1 January 2004.

Inspired and modified from Kitchen Cheesemaking, Lue Dean Flake, Stackpole books, pp. 82-85.

If you are new to cheese making, please read the page on [Beginning Cheese Making](#) for suggestions of easy cheeses to start with. Swiss cheese is not one of the simpler cheeses to make. The following recipe is still being refined. I believe it is more complex than absolutely necessary, but have not yet performed all the experiments to know how to best streamline it. If you have experience making Swiss cheese, let us know the lessons your have learned.

One of the major differences between Swiss and other cheeses is that a unique bacterium, *Propionibacterium shermanii*, is used to ferment the cheese after it is formed into a wheel. This bacterium produces carbon dioxide (hence the bubbles or "eyes" in the cheese), and propionic acid which gives Swiss its unique bite.

Ingredients to turn a gallon of milk into a pound of Swiss cheese:

1 gallon fresh milk
1 tablespoon fresh yogurt (with equal parts *L. bulgaricus* and *S. thermophiles*.)
1/4 teaspoon *Propionibacterium shermanii* culture
1/2 tablet Junket Rennet

PROCEDURE:

- 1) Warm milk to 95 F.
- 2) Add small amount of milk to the yogurt and *P. shermanii* cultures, stir to mix, whisk thoroughly into milk, let set 20 minutes.
- 3) Meanwhile, dissolve 1/2 tablet rennet in 1/4 cup fresh cool water
- 4) Stir the dissolved rennet into the inoculated milk, cover undisturbed for about 30 minutes until a clean break is achieved. If it takes longer than 30 minutes, use more rennet next time.
- 5) Cut the curd by making 1/8th inch vertical cuts in two directions to make long 1/8th inch strips. Then

whisk the strips with a pastry whisk so that all levels of the curds are cut. Final curd pieces should be the size of a wheat grain. Maintain temperature at 95 F.

6) Hold the temp at 95 F for 30-40 more minutes, then slowly increase the temperature with stirring to 125 F. Hold at 125 F for an additional 45 minutes.

7) Test for completed cooking by squeezing a handful of curds into a ball. If it readily breaks up when rubbed between palms, it is ready.

8) Let curds settle, dip off some whey.

9) Dip out the curds into a clean handkerchief suspended in a strainer over a catch bowl.

10) Pick up the four corners of the handkerchief, dip into whey to loosen curds, then set in cheese hoop.

11) Press for five minutes, remove, replace cloth, and press for three more hours.

12) Rinse cloth in saturated salt water, replace in press for three more hours.

13) Repeat rinsing of cloth in salt water and pressing for three additional hours.

14) Repeat rinsing of cloth in salt water and press overnight.

15) Prepare saturated salt water bath: dissolve 5 Tbl salt in 16 oz water (some salt remains undissolved).

Pour into a plastic container slightly wider than the cheese, cool the salt solution down to 45 F. Float cheese for two days in this 45 F brine, turning each day, sprinkle salt on surface of cheese.

16) Finally, place cheese on board at 50-55 F, 90% humidity. Wipe and dry board daily for 10 days.

Wipe the cheese with salt soaked cloth and turn. Rub the cheese with salt at end of 10 days.

17) Move cheese to 70 F, 70-80 % humidity. Wipe with clean salt water 2x per week, continue for a month and a half. Cheese should puff up as characteristic holes form.

18) Final curing at 40-45 F takes 4 months to a year.



FETA CHEESE

David B. Fankhauser, PhD
Professor of Biology and Chemistry
University of Cincinnati Clermont College
Batavia OH 45103



Feta is
preserved
in brine

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Created 16 Oct 98
This page has been accessed Counter times
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Rinse off the brine
before serving

Feta is traditionally made in [Greece](#) from [ewe's milk](#), but I have had success using my goat's milk. I see no reason why cow's milk would not work as well. It is a fresh, snow white cheese which is pickled in brine. It is fabulous with kalamata olives and pita bread, as well as in a Greek salad.

By the way, the most popular Turkish cheese called Beyaz Peynir uses essentially the same recipe. We *loved* it with our breakfasts when we have visited [wonderful Turkey](#). (It may be better not to tell the Turks that it is just like feta, and vice versa... ;-)
(Thanks to "Lynn" from the Lactobacillus Board for helpful suggestions.)

INGREDIENTS AND APPARATUS:

- 1 gallon fresh goat's milk (You can use store-bought cow's milk as well.)
- 1 Tbl fresh yogurt (I have had most success with [Dannon Plain](#).)
- ½ tablet rennet, dissolve in 1/4 cup water (I have always used [Junket Rennet tablets](#).)
- 1+ gallon pot with lid ([stainless steel with heavy bottom](#) is best, enamel works, but you must stir it!)
- 1 long bladed knife
- 2 clean sterile handkerchiefs
- strainer
- cheese mold: Cut the ends out of a smooth-sided 4 x 5 inch tin can, save one of the cut ends.
- table salt



1. [Warm milk to 30°C \(86°F\)](#). Stir regularly so that it does not burn on the bottom. (Less stirring is required if the pot has a thick heat dissipating bottom.) Remove from heat.

2. Mix 1 Tbl yogurt with equal part milk to blend, then stir the blended yogurt and milk into the warmed milk to thoroughly mix. Cover and let inoculated milk sit for one hour at room temperature.



3. While the inoculated milk sits, [dissolve 1/2 tablet rennet in fresh cool water](#).



4. After the inoculated milk has sat for one hour, [add dissolved rennet to the inoculated milk](#), stir to mix thoroughly.



5. Let the inoculated, renneted milk sit covered overnight at room temperature.



6. The next morning, the [milk should have gelled](#). Some of the whey will have separated. Check for a clean break.

Cut curd as per [basic cheese](#): start at one side, cut straight down to bottom. Make the next cut $\frac{1}{2}$ inch from and parallel to the first, but sloping slightly (the sliced curd will be wider at bottom than top). [Repeat increasing angle with each cut](#). Turn pot 90° , [repeat cuts](#). Repeat cuts and turning two more times. The curd pieces should be about $\frac{1}{2}$ inch cubes.

7. With very clean hand and arm, reach to the bottom and gently lift the curds to stir. [Cut large pieces which appear with a table knife so that they are \$\frac{1}{2}\$ inch cubes](#).

Let the cut curds sit, with occasional stirring, for 10-15 minutes until curd is somewhat contracted.

8. Decant off the whey through the strainer lined with the handkerchief, pour curds into handkerchief. (In this image, I am draining off the top whey without filtering it.) Save the whey to make whey brine in step 11.



Let drain until no more whey drains out (about 2-4 hours). It may be drained at room temperature, or in the refrigerator, as shown in the image.



9. Place drained curds into a bowl, mix in a $\frac{1}{2}$ tsp salt, breaking up the curd.

10. Press into mold as per basic cheese: Line can with handkerchief, place curds inside, fold over ends of cloth, place end on top, and place weight on top of that. Let sit overnight.



11. Prepare pickling *whey brine*(12.5% salt): 20 oz of whey (from step 8) plus 5 Tbl salt. Stir to dissolve. The brine must be acidic or else the cheese will melt on the surface (speaking from experience...)



12. Cut cheese into 1.5 inch cubes, place into wide-mouth jar. [Pour brine over to cover](#). Let pickle for several days in the refrigerator. The cheese will become drier and more easily crumbled with time. Store in the frig. [Rinse before use to remove excess salt](#).

	GJETOST/ MYSOST ©David B. Fankhauser, Ph. D. Professor of Biology and Chemistry U.C. Clermont College Batavia OH 45103	
boiling down the whey	Created 20 August 2002 File "Gjetost.htm" was last modified on NaN undefined NaN. This page has been accessed Counter times since 20 August 2002.	Finished gjetost

Gjetost literally means "goat cheese" in Norwegian. The name is often applied in the United States to an unusual cheese made by evaporating down whey left over from making more traditional cheese. (I am told by a Norwegian fellow that the more correct name for this whey cheese is *mysost*. [Here is his email to that effect](#) , with links to pictures of gjetost.) What follows is a description of how to make mysost, apparently incorrectly termed gjetost in the States.

By reducing whey by simmering in an open pot, the salts, sugars and protein left in solution after separating the curds from the "curds and whey" are concentrated. This produces a cheese which is a combination of sweet, salty and caramel. You may want to try some gjetost from a local cheese speciality shop before you commit the time and energy to make it. It is a "cheese" unlike any other. It takes a long time to boil down the whey. (Not dissimilar to making maple syrup.)

Click all images to enlarge:

EQUIPMENT	SUPPLIES

A stainless steel pot with a thick heat-dissipating bottom (either aluminum or copper). It should be larger than the amount of whey you will boil down (1.25 gallon capacity in this case)

A greased pan into which to pour the finished product.

1 gallon of fresh whey from making regular cheese

PROCEDURE FOR MAKING GJETOST



1. Pour fresh whey into the thick bottomed pot (with a capacity larger than the amount of whey you will reduce).



2. Bring to boil over high heat with stirring (some protein precipitated out for me, but this may not be usual).



3. Lower the heat so that it simmers and leave uncovered for as many hours as it takes to reduce the volume. (Sorry, the thermometer is out of focus)



4. When the consistency has become more viscous (about 5-6 hours for me), watch closely, and stir regularly to prevent from burning or sticking.



5. When the consistency resembles fudge, remove from heat, stir vigorously (whisk?), and pour into a buttered pan. (I used wax paper, but the paper stuck to the finished cheese.) [Matthew Vanderpool, who followed this recipe, reports that rapid cooling is one of the tricks to smooth finished product. His mysost was grainy, so he reheated it, stirred well, and rapidly cooled it in an ice cold buttered container. He reports that it turned out "smooth as can be."]



6. Allow to cool. Refrigerate until you use it. Slice it thinly. The Scandinavians serve it on Ryekrisp crackers.

Mine was quite salty, sweetish, granular (not whisked enough), but definitely in the same family as gjetost... I believe that the granularity was because I did not whisk it adequately as it was cooling, allowing the salts and sugar to crystalize. I suspect that making gjetost it is similar to making fudge in the final stages.

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MAKING PANIR

©David B. Fankhauser, Ph.D.,
Professor of Biology and Chemistry
University of Cincinnati Clermont College,
Batavia OH 45103

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Making panir is an exercise in acid/heat precipitation of protein. The big trick is not to burn the milk while you heat it to hot but not boiling. A thick bottomed stainless steel pot should do, but lacking that, try heating the milk in a water bath so that the volume of water stabilizes the temp. Here is my recipe for panir:

1. Heat one gallon milk in a stainless pot with a thick bottom to 185° F (85° C). Stir constantly enough to prevent scorching.
2. Stir in 1/4 cup of white vinegar.
3. Stir until curd forms and separates. (Within a minute or less.)
4. Cover and let cool to a manageable temperature.
5. Line a strainer with a sterile handkerchief, pour in the mixture to allow the whey to drain though and separate out the curds.
6. Pick up the corners of the handkerchief, loop a thick rubber band around the ends and hang to drain for several hours in a cool place. The fine curd slows down the drainage.
7. Remove the panir to a container and refrigerate. It will keep for 2-4 weeks.



RENNET FOR MAKING CHEESE

©David B. Fankhauser, Ph.D.,
Professor of Biology and Chemistry
University of Cincinnati Clermont College
Batavia OH 45103



Front of Junket
Package

File "Rennet.html" was last modified on NaN
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This page has been accessed Counter times since 12
March 2002.

Back of Junket
Package

7/20/89, rvsd 6 August 1993, 23 July '95, 22 July '97, 19 July 98, 30 June 99, 17 July 00, 9 Aug 00

I have received countless questions about rennet (also called rennin or chymosin), and am therefore posting a page on it.

First a little background:

HISTORY OF RENNET: Presumably, the first cheese was produced by accident when the ancients stored milk in a bag made from the stomach of a young goat, sheep or cow. They found that the day-old milk would curdle in the bag (stomach), yielding solid chunks (curds) and liquid (whey). Once they discovered that the curd-chunks could be separated out and dried, they had discovered a means by which milk, an extremely perishable food, could be preserved for later use. The addition of salt was found to preserve these dried curds for long periods of time.

At some point, someone discovered that the most active portion of the young animal's stomach to cause curdling was the abomasum, the last of the four chambers of the stomach of a ruminant animal. (In sequence, the four chambers are rumen, reticulum, omasum and abomasum.) In particular, the abomasum from a suckling kid or calf was especially active. The abomasum was cut it into strips and dried. A small piece would be added to milk in order to turn it into curds and whey. At some point, the Germans began calling this material *rennen*, meaning to run together, or to coagulate. The technical term for rennin is chymosin. Here is a [technical description of its action](#) on the various proteins in milk.

MODERN RENNET: Until 1990, rennet was produced the old fashioned way (from abomasums), from various "vegetable" rennets (some of which, called microbial coagulant, are made from the microorganism *Mucor miehei*.) These days, at a cost one tenth of that before 1990, chymosin is produced by genetically engineered bacteria into which the gene for this enzyme has been inserted. When the bacteria are grown in large vats, they secrete rennin, and it is then purified for cheese making. Rennet is available commercially in tablet or in liquid form. You will find some cheese makers on the web who prefer liquid rennet and disparage the use of rennet tablets. Perhaps, if you are

making hundreds of gallons of milk into cheese, buying bulk liquid would make sense, but for making one to ten gallons of milk into cheese, the tablets make sense. I have never had any problems using rennet tablets in making a wide variety of cheeses, and since it is a principle of mine to try to use materials which are readily available locally, I have used tablets for years.

JUNKET RENNET TABLETS: I prefer Junket Rennet tablets because they are readily available and inexpensive. They are easily measured out (1 tablet will coagulate 5 gallons of inoculated milk) are stable because they are in dry tablets. They can often be found in the pudding section of your supermarket. The [front](#) and [back](#) of the pack is shown above. If they are not there, ask the manager if he or she would please order them. Most managers are willing to do so. (My local Kroger's Store here in Cincinnati has been very cooperative over the years.) If you have no success at your local store, **you can order the tablets** through [their web page](#), **by phone at 1-800-556-6674**, or directly from Redco Foods, Inc., P.O. Box 879, Windsor, CT 06095 (formerly the Salada Foods Division). Be sure to order the plain rennet, not the pudding mixes. "Junket Rennet Tablets" come in a packages of 8 (6.5 g) or (used to be) 12 tablets. Their page [on uses of rennet](#) includes several cheese recipes I wrote for them. Here is their page on [Junket Dessert products](#).

LIQUID RENNET: One teaspoon of liquid rennet is reported to be equivalent to one Junket Rennet tablet. Thus, you would use one teaspoon to coagulate five gallons of inoculated milk, or 4 drops/gallon of inoculated milk. (I have only used tablet rennet, but am assured that liquid rennet works just as well as the tablets.) Liquid rennet can be ordered from various cheese maker's suppliers or which [New England Cheese Making Supplies](#) is prominent on the web. I have heard (but have no personal experience) that the liquid rennet loses its potency with age, and one must add more and more to achieve the same degree of coagulating.

MICROBIAL RENNET: A rennet of bacterial origin, called microbial coagulant, is made from *Mucor miehei*. This tableted rennet should pose no problem for vegetarians. I have never used it but here is [some information on it](#) , and also a place to [order it](#).



USE OF JUNKET TABLETS: They come packaged sealed in foil. One tablet will clabber 5 gallons of inoculated milk. To use it, you [dissolve the tablet in a small amount of water](#) (1 tablet in 1/4 cup fresh clean water). [The solution will be slightly cloudy](#) . Look for and crush undissolved chunks at the bottom of the glass. The dissolved rennet is then [stirred into the inoculated milk](#) .

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LIMONCELLO

©David B. Fankhauser, Ph.D.,
Professor of Biology and Chemistry
University of Cincinnati Clermont College,
Batavia OH 45103

This page has been accessed Counter times since 16 April 2006.

Limoncello is an aperitif liqueur typical of southern Italy, especially along the Amalfi coast and Sorrento. It is commonly enjoyed after a meal of pizza, etc. The lemons of the Amalfi coast produce a particularly rich zest (yellow, outer part of the rind) which gives it its depth of flavor. These flavors are efficiently extracted with 95% alcohol, then the extract is diluted with a sugar syrup to make the finished liqueur. Once you filter out the particulates and thoroughly chill it, it is ready to consume. Aging does not improve the flavor. Thanks to Larry Blodgett from whom I first got this recipe.

How to make the Italian liqueur limoncello, at home.

INGREDIENTS:

Peel the zest from 9 lemons, preferably organic. Scrub the outside of the lemons if in doubt. Avoid the white as much as feasible, it is bitter.

30 ounces of 190 proof alcohol such as "Everclear" etc. (900 mL or half of a 1.75 liter bottle). (May not be available in UK?)

25 ounces table sugar (sucrose)

22 ounces boiling water

PROTOCOL:

- 1) Peel or grate the zest from 9 large fresh lemons (preferably organic: they should be clean of pesticides and added wax on the surface).
- 2) Suspend the zest in 30 ounces of 190 Proof alcohol for 48 to 72 hours (up to a week) in a sealed container.
- 3) Dissolve 25 oz. sugar in 22 ounces of boiling water. Boil briefly to thoroughly

dissolve the sugar.

- 4) Cool the syrup to near room temperature and stir into the lemon extract mixture.
- 5) Refrigerate the mixture for 24 hours.
- 6) Strain into bottles and store in the freezer.

Serve ice cold in aperitif glasses.

You can use the juice from the lemons for GRANITA AL LIMONE ("Lemon Ice")

2 cups lemon juice
1 cup water
2 Tbs. sugar

Blend all the ingredients, making sure that the sugar is completely dissolved. Strain the syrup into a flat pan and place in freezer. Scrape occasionally while freezing and churn before serving.

This recipe comes from http://www.italianmade.com/recipes/recipe.cfm?recipe_ID=413

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Image one	MAKING CREAM CHEESE ©David B. Fankhauser, Ph.D., Professor of Biology and Chemistry University of Cincinnati Clermont College, Batavia OH 45103	Image Two
legend for image one	File "Cream_Cheese.htm" was last modified on NaN undefined NaN. This page has been accessed Counter times since 4 September 2006.	legend for image two

HOW TO MAKE CREAM CHEESE:

Ingredients:

2 cups whole milk (500 mL)

2 cups heavy cream (500 mL)

2 Tbl fresh cultured buttermilk (30 mL)

1/4 tablet Junket rennet tablet

sterile white plain handkerchief (boil to sterilize, hang to dry thoroughly)

Protocol:

- 1) Combine milk and cream in a stainless pot. Gently warm to 70 F (21 C), stir regularly.
- 2) Mix buttermilk thoroughly into the warmed milk-cream mixture. Cover.
- 3) Let sit 15 minutes. Meanwhile, dissolve 1/4 tablet of Junket rennet in 1/4th cup cool water (30 mL).
- 4) Thoroughly stir solution of rennet into inoculated milk/cream, cover again.
- 5) Allow to sit overnight at warm room temperature (70-75 F).
- 6) The mixture should have gelled by the next morning. Sprinkle 1/2 - 1 tsp salt on the surface.

Stir briefly and gently with a whisk to produce pieces about the size of a pea.

7) Line a large strainer with the sterile handkerchief. Gently pour the semi-liquid product into the cloth. Let drain for 30 minutes.

8) Pick up the corners of the cloth, wrap corners in a looped thick rubber band, hang over a bowl to drain. You may hang in a refrigerator if your house is hot.

9) Turn solidifying mass in the cloth to hasten drainage. Store in a refrigerator. Use within a week or so.



Dough ready for shaping

WHOLE WHEAT BREAD RECIPE

David B. Fankhauser, 21 August
2000



Freshly baked bread, cooling.

This page has been accessed
Counter times since 21 Aug 00.

This is a 100% whole wheat bread. If you have never made bread before, I would suggest that you try a white flour bread first because it is much easier to knead the dough to a smooth and elastic texture. (Yes, of course I know that white bread lacks vitamin E, roughage, etc. But making white bread before whole wheat is like crawling before walking. You don't have so far to fall.) Use finely ground whole wheat for better textured dough, and higher risen breads.

It makes enough dough for four loaves and a pizza or a [pan of schnecken sweet rolls](#) . (Obviously you can scale it down or up...)

(There will be more pictures eventually, we are just now getting this page together...)

INGREDIENTS

1 package active dry yeast (or 1 Tbl bulk active yeast)

1/2 tsp sugar

1/4 cup water 100 F (37 C)

6 cups water, 100 F (37 C)

1 Tbl molasses

1 tsp salt (more or less, depending on taste)

9-12 cups whole wheat flour, finely stone ground. (I am embarrassed to say I buy mine from the ADM corporation. Embarrassed because they are a huge agribusiness corporation...)

EQUIPMENT

small drinking glass (to start the yeast)

whisk

bowl, 1 gallon (4 liters)

2 gallon enamel or stainless pot with lid (8 liters)

Four medium sized bread pans (approximately 4 inches (10 cm) wide at bottom)

vegetable oil

	1) Start the yeast: Warm 1/4 cup water to 100 F, dissolve 1/2 tsp sugar, stir in Tbl active yeast to suspend. Set a side for 10-15 minutes. It should foam up in that time. If not, get some good yeast.
	2) Warm 6 cups of water to 100 F, add to bowl, whisk in the molasses and the salt. Add the foamy yeast, whisk in.
	3) Whisk in flour, 2 cups at a time until it is too stiff to easily mix with the whisk. Clean dough off of whisk. Add another cup or two of flour on top of dough, work down along the sides with your fingers so the dough does not stick. Continue adding flour until dough begins to "come together." (Gets slightly firmish...)
	4) Sprinkle a cup or two of flour on a clean kneading surface (porcelain counters work great), and turn out dough onto the flour. Loosen stuck spots in the bowl by rubbing with flour. Sprinkle flour on top of dough, and lightly bring in edges with your fingertips, folding over on top. Every time you see a wet spot, hit it with a little flour, keep folding over and turning on itself. Continue until there are no more major wet spots.
	5) Knead the dough until it is smooth and elastic: Fold the dough in half, press down and roll with the heel of your hand, turn the dough a quart of a turn. Repeat these steps over and over, adding small amounts of flour to prevent sticking either to the board or to your hands. Do not add so much flour that the dough gets tough or hard. Notice that the actual amount of flour added depends on the nature, grind, amoung of gluten, etc. of your flour. This is the <i>art</i> of bread making: you kneed in flour until it is the correct consistency.

6) Brush the 2 gallon pot with a small amount of oil to prevent the dough from sticking, and turn the dough in to the pot. Turn the dough over several times to coat all sides with oil. Cover the pot, let sit in warm place until double in size, about an hour or so, depending on how warm the spot is. Do not let it get above 105 F (40 C).



7) Punch the dough down, knead briefly to bring back together, and weigh out four pieces of 1 3/4 lbs each. Reserve the remaining 1 pound of dough for either a pizza, or [schecken sweet rolls](#).



8) Knead each of the four loaves until they are smooth and elastic. Let rest for a few minutes, then shape each into a loaf as follows:

SHAPE THE LOAVES:

Press out into a rectangle about 6 x 8 inches. Roll snugly along the long dimension, and pinch the end edge against the body of the loaf. Turn the seam so it is on the bottom, and press each end with the side of the hand about 1/2 inch from the end and turn each flap under the loaf. (We need pictures here...)



9) Gently transfer the loaf to a lightly oiled bread pan so that all seams are on the bottom, and it is centered in the pan. Repeat for the other three loaves.

Place on a carrying rack.



10) Wet a clean, white non-terrycloth dish towel, and wring out as much water as you can. Cover the four loaves with the damp towel, and place the rack in a warm place until doubled in size. Do *not* let the loaves over-rise, or they will fall, and you will have "flat top" bread... This is especially a problem with coarsely ground flour.

The pan at the left is a cinnamon-pecan roll, [similar in construction to schnecken](#) . It will be covered with a camp cloth also.

11) Pre heat the oven to 360 F *before* the loaves have doubled in size. With the oven preheated and the loaves doubled in size, place the loaves on a rack in the middle of the oven (top rack and bottoms racks often burn edges). Ensure equal circulation of hot air around all sides of each pan.

Check after 20 minutes to be sure they are evenly baking. Rotate loaves if you see some more done than others.



12) After 30-35 minutes, remove the most done looking loaf with hot pads/mitts. Remove it from the pan. Sometimes it takes a sharp rap of the corner of the pan on a hard surface to free it. Thump the bottom of the loaf with a sharp rap of the finger. If it sounds hollow, it is done. If it sounds muffled or sodden, bake it 5 minutes more and test it again. As loaves sound hollow, remove from the oven, and place on a cooling rack which allows air circulation so the steam can escape.

This is a good time to taste the heel with a slab of cold butter...

13) When the loaves have thoroughly cooled, place the in a large plastic bag, close to seal, and store in the refrigerator.

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File "BREAD_whole_wheat.htm" was last modified on NaN undefined NaN.

CLOTTED CREAM

©David B. Fankhauser, Ph.D.,
Professor of Biology and Chemistry
University of Cincinnati Clermont College,
Batavia OH 45103

File "Clotted_Cream.html" was last modified on NaN undefined NaN.

This page has been accessed Counter times since 26 March 2005

Created 15 March 2005

I got an email asking how to make clotted cream. I had a general idea, but it was supplimented by an [article in the Old Farmer's Almanac](#).

Here is a recipe which blends mine and theirs:

Original clotted cream is made from raw milk, not so easy to find these days...

- 1) Collect a pint (or more) of unpasteurized, unhomogenized cream or rich milk.
- 2) Gently heat until a semisolid layer of cream forms on the surface.
- 3) After it cools, skim off the thickened cream into a clean container.
- 4) Refrigerate.

I do not know how corporations make it.